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AFFTC-TR-55-27
NOVEMBER 1955

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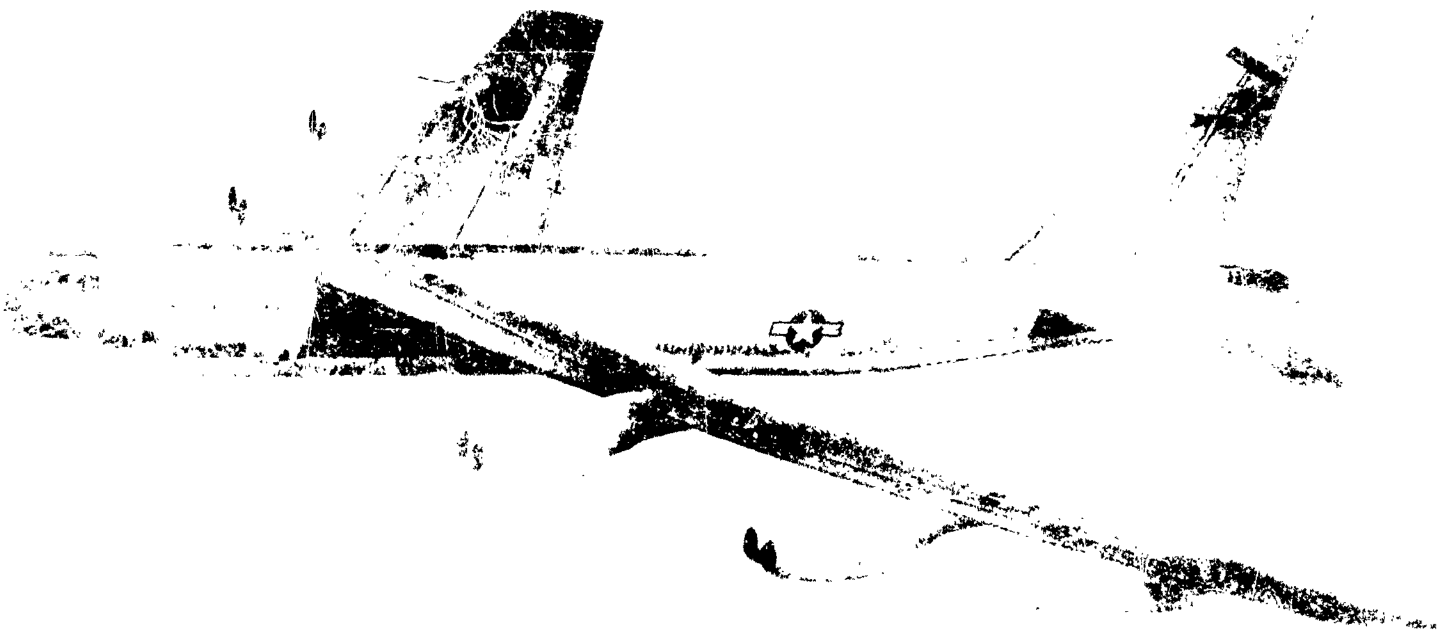

AIR FORCE FLIGHT TEST CENTER
EDWARDS AIR FORCE BASE, CALIFORNIA
AIR RESEARCH AND DEVELOPMENT COMMAND
UNITED STATES AIR FORCE

AFFTC-TR-55-27
November 1955

PHASE IV FLIGHT TEST OF THE BOEING B-52A AIRPLANE USAF NO. 52-003

GUY M. TOWNSEND, Lt. Col., USAF

Project Pilot

ALFRED D. PHILLIPS

Project Engineer

UNITED STATES AIR FORCE
AIR RESEARCH AND DEVELOPMENT COMMAND
AIR FORCE FLIGHT TEST CENTER
EDWARDS AIR FORCE BASE, CALIFORNIA

ABSTRACT

At its present stage of development, the B-52 is considered to be an excellent long range, high altitude, heavy bomber. It is significant to note that all of the deficiencies that were present during Phase II of the Flight Test program have been corrected with the exception of "Pitch Up" that is caused by spoiler application and the lack of stall warning in the approach configuration without external tanks. These deficiencies are not considered to be critical.

The data obtained during this test program form the basis for the latest Pilots' Operating Instructions for the B-52B. The performance is substantially the same as previously estimated except for a degradation of eight percent in range. Also, a braking deficiency at heavy weight causes the refusal speed to be decreased by eight percent and the critical field length to be increased three percent.

AFFTC-TR-55-27

November 1955

PUBLICATION REVIEW

This report has been reviewed and approved

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APPENDIX I

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A. INTRODUCTION

1. Project Objective

Phase IV Flight Tests of the B-52A AF52-003 airplane were conducted to obtain performance figures necessary to revise estimated data to flight checked data for the Flight Handbook and Standard Aircraft Characteristics Handbook. A limited quantitative stability and control program was conducted in order to spot check the stability data obtained on the Phase II tests of the XB-52 USAF No. 49-230 and to obtain enough information to confirm compliance with those portions of Air Force Specification Mil-F-8785 (Flying Qualities of Piloted Airplanes) that are considered necessary for confirmation of estimated handling characteristics.

2. Project Authority

These flight tests were authorized by Headquarters Air Research and Development Command Test Directive 5386-F1 dated 8 June 1954.

3. Project History

The Phase IV Test Program for the B-52A airplane was accomplished at the contractor's facilities at Boeing Field, Seattle, Washington, from 25 January 1955 through 10 August 1955. Forty-three flights totaling two hundred-twelve hours and thirty-three minutes were conducted during this seven-month sixteen-day period.

4. Description of the Aircraft

a. The B-52A is a high altitude, high speed, long range heavy bomber. The aircraft is characterized by swept wings and eppennage with two fixed struts per wing, each supporting two engines. Other external features include a bicycle landing gear, two wing tip protection gears, a tail turret employing four 50 caliber machine guns, and a side-by-side cockpit as compared to the tandem seating arrangement of the prototype B-52 airplanes. The normal crew comprises a pilot, copilot, two navigator-bombardiers, an ECM operator and a tail gunner. The primary flight controls are tab operated. The horizontal stabilizer is hydraulically movable as a unit to provide longitudinal trim. Lateral trim is accomplished by electrically operated tabs. Directional trim is achieved by manual trimming of the rudder control tab. Aileron control is supplemented by seven hydraulically actuated spoilers on each upper wing surface. The spoilers on both wings can also be opered simultaneously as speed brakes. Four electrically controlled wing flap segments, two on each wing, are provided for additional lift devices on takeoff and landing. A ribbon-type drag chute is provided for additional drag to slow the airplane during landing roll.

b. The aircraft is powered by eight Pratt and Whitney turbojet engines which provide a total thrust of approximately 75,000 pounds. The engines are of the split-compressor type and feature hydromechanical fuel controls. Water is injected into the engines for additional engine

thrust for a period of 157 seconds during takeoff. No after-burning is provided.

c. All power to drive accessories in the airplane is derived from high pressure, high temperature air bled from four ports on each engine through stainless steel ducts to turbine units remotely located in the wings and fuselage. The system services the surface anti-icing, nacelle anti-icing, water pumps and air conditioning and provides all accessory power. All hydraulic pressure in the aircraft is obtained from ten remotely located individual supply systems which provide the hydraulic requirements for the respective areas of the airplane. The source of electrical power is from four alternators driven by pneumatic air and located in the forward wheel well. This system supplies the primary power requirements for 200-volt, 400 cycle, 3 phase alternating current.

D. The airplane was tested in the clean and external tank configuration. There were no external changes made on the aircraft during the program. The aircraft was weighed with all test instrumentation installed, with the ECM equipment and bombing-navigation ("K") system removed, and with all fuel tanks empty. The basic weight was found to be 168,340 pounds. However, the basic weight of the first airplane delivered to the Strategic Air Command was 169,214 pounds. All fuel tanks were calibrated by means of a calibrated nozzle and by weighing the servicing truck before and after fuel delivery. Control of center of gravity during flight was accomplished by the transfer and use of fuel. Tests were conducted at gross weights ranging from 180,000 to 408,000 pounds. Detailed weight and balance data, photographs of the test aircraft, and photographs of the instrumentation used appear in Appendix II.

B. TEST RESULTS

1. Crew Compartment Description

Access to the flight deck is gained by steps in the navigator's downward ejection hatch which is hinged at the aft end and supported by cables in front. The navigator and the bombardier are seated side by side in downward ejection seats on the lower flight deck. A small ladder is provided to allow access to the upper flight deck. The two pilots are seated in upward ejection seats side by side. This is considered an excellent arrangement as far as crew coordination is concerned, although visibility has been sacrificed. Visibility during straight and level flight is satisfactory but is very poor in turns and during air-to-air refueling. This is caused by the overhead cabin structure. The primary controls are located between the pilots, and secondary controls are divided between the pilot and the copilot on side panels. The pilot's side panel contains the hydraulic, water injection, liaison radio, and IFF controls, while the copilot's side panel contains the cabin pressurization, electrical, engine starter, pneumatic interconnect and refueling controls. All in all, this pilot's station arrangement is superior, with the following two major exceptions. Less important items are included in Appendix I, page 4 through 8.

a. The pilot's and copilot's seats incorporate a unilateral seat adjustment that allows motion in the up and forward, or down and back directions only. This is unsatisfactory especially during air-to-air refueling where the visibility is already marginal. The lack of adequate seat adjustment aggravates this marginal condition. The seat pan is too narrow (17 inches). This dimension should be increased to 23 inches to allow the pilots to shift their weight to avoid fatigue. The restricted position, which is caused by the equipment, makes long flights fatiguing. There are 17 individual items that have to be hooked up or plugged in when the seat is entered. The mere fact that there is so much physical exertion involved in getting in and out of the seat discourages either leaving the seat to stretch or "swapping off" with relief crew members even if they are available. The solution to this problem is the installation of an integrated seat where the parachute and the survival kit are attached together and remain in the seat. The parachute harness is integrated into the survival suit and the crew member has to connect only four attachments instead of the present three parachute, two survival seat, two shoulder harness, lap belt and parachute deployment lanyard.

b. The forward entrance hatch is difficult to close and requires considerable pounding on the part of the ground crew to provide a positive hatch closed indication. This indication is a red light located on the forward instrument panel in front of the pilot. There are six hatches that could cause this warning device to actuate, but there is no method of determining which one is causing the light to burn. This deficiency has plagued the entire B-52 program. In view of the fact that generally the warning system itself has been found at fault, the tendency is to disregard it. However, one hatch has been lost in flight. This could be quite serious, especially if it occurred in the vicinity of two crew members who were changing positions. There is a very definite requirement for a reliable positive warning system that will indicate when any of the hatches

are not in the fully latched position. Further, this device should incorporate some positive means of determining which one of the hatches is causing the warning system to be actuated.

2. Taxiing and Ground Handling

Since the B-52 is equipped with a quadricycle bicycle type landing gear, nose wheel steering is the only means of directional control on the ground. Steering is actuated by the rudder pedals and provides a two-position ratio of either 12 or 55 degrees in either direction at full rudder travel. The desired ratio is selected by a two-position control located on the pilot's forward aisle stand. The tip protection gears, located near the wing tips, have a span of 148 feet. These wheels touch the ground during high gross weight, cross-wind, and turning conditions. With the exception of monitoring the position of these wheels, taxiing is quite pleasant and is very straightforward. The short turning radius is considered an excellent feature. It is impossible for the pilots to adequately clear their own wing tips in congested areas in an aircraft of this size. This situation is aggravated in the B-52 by the small angle between the pilot's line of vision and the leading edge of the wing. The solution to this problem is to clearly mark taxi lanes and keep obstacles well clear of these lanes.

3. Takeoff and Initial Climb

All takeoffs were made with full throttle before brake release. In the case of wet (water injection) takeoffs, the water pump switches were turned on prior to advancing the throttles. The P_{t_7}/P_{t_2} (Engine pressure ratio, E.P.R.) instruments proved invaluable for determining that the engines were developing normal thrust and that each engine was getting water. Prototype engine pressure ratio instruments were used and their reliability was very poor. Since these instruments are essential for proper operation of the J-57 type engine, reliable instruments must be developed. It is essential that adequate takeoff planning be performed when runway length is equal to "Critical Field Length". In this condition, the ground roll is about 90% of the total runway. The planning and takeoff were done in the following manner rather than the method recommended in the Pilot's Handbook. The runway was marked in thousands of feet with signs that were clearly visible from the cockpit. Refusal speed was calculated, then from a speed-distance curve a "go or no-go" speed was calculated for the last thousand foot marker before refusal distance. For example: For a 405,000-pound aircraft on a no-wind, sea level standard day, the refusal speed for a 10,000-foot runway would be 123 knots at 5,600 feet. The speed at the 5,000-foot sign should be 117 knots. Pertinent takeoff data were then calculated and recorded on a card that was placed in a slot in the medallion on the pilot's and copilot's control column as shown in Figure 1. This is a modification of the standard medallion and proved quite valuable. It is recommended that this change be incorporated in production.

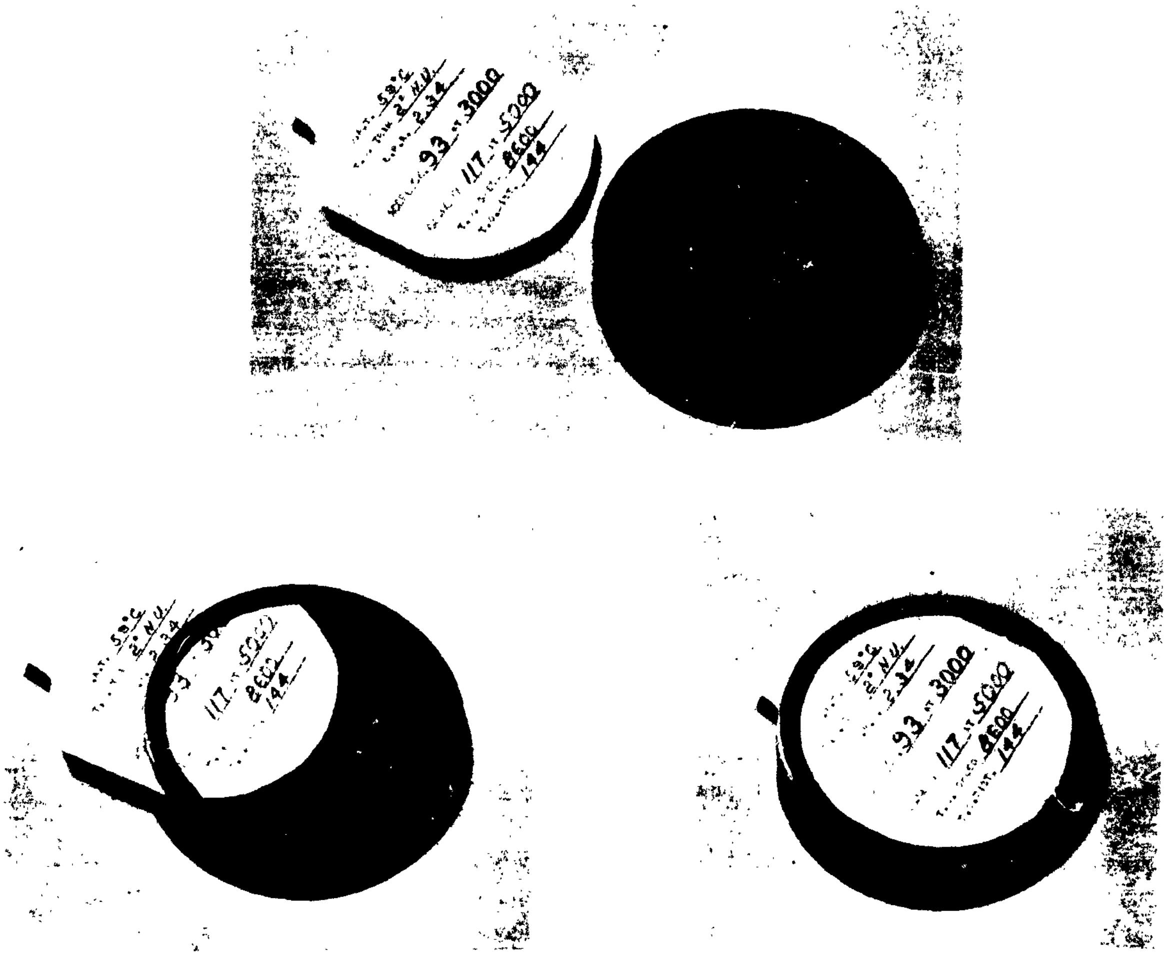

Figure 1

It is very desirable that the takeoff roll be started as soon as possible after power is applied to take advantage of the thrust overshoot characteristics of the J-57 engine. This overshoot amounts to about 2,000 pounds thrust, or 250 pounds per engine, both wet and dry. An expeditious procedure was to perform all other checks prior to advancing power and then with brakes set and the aircraft lined up for takeoff, full power was applied. The pilot checked the left wing and engines and reported "Left wing O.K.", the copilot checked the right wing and engines and reported, "Right wing O.K.". An engine check was then made with emphasis on the engine pressure ratio instruments. Trakes were released and the takeoff roll was started. Prior to reaching the 3,000-foot marker, the copilot reported, "Coming up on three" and raised his hand over the aisle stand in the pilot's field of vision and lowered it rapidly as the 3,000-foot marker was passed. This allowed the pilot to check the exact speed at 3,000 feet. If the speed was too low at this point, the takeoff was refused. This procedure was repeated at 5,000 feet. If the speed was not at least 117 knots at this point, the pilot called for a refused takeoff and immediately retarded the throttles to idle, raised the speed brakes and applied the brakes while the copilot deployed the

brake parachute. If the aircraft was on speed at 5,000 feet (117K), the takeoff was continued but after this point the aircraft was committed to takeoff. Just prior to reaching takeoff speed (149 knots) the pilot applied back pressure and the aircraft rotated and flew off. The landing gear was then retracted and the aircraft was allowed to accelerate to the wing flap placard speed (170 knots). As the flaps are retracted, there is a marked increase in drag which was quite noticeable. Therefore, during critical heavyweight operation the aircraft should be climbed to 1,000 feet altitude prior to flap retraction. All performance takeoffs were made by holding the control wheel full back as soon as the takeoff was committed (go or no-go speed). Under these conditions, the front gear came off the ground approximately two seconds before the aircraft rotated rather sharply and became air-borne. When the aircraft was airborne the back pressure was relaxed and the initial climb to 50 feet altitude was made at approximately 8 knots over takeoff speed. It was found that it was essential that the temperature and wind be measured on the runway since large differences were found between the tower reported conditions and those recorded on the runway. Lightweight seven-engine takeoffs were accomplished without difficulty. No-flap takeoffs at light and medium weights were proved to be quite practical. These procedures can be used to ferry the aircraft out of bases where maintenance is not available. A refused takeoff was conducted at 405,000 pounds. The test stopping distance was found to be 65% greater than the predicted distance. This required a revision in the critical field length and refusal speed data. Quantitative results of this test will be presented in the addendum to this report. The prepositioning type cross-wind landing gear installed on the B-52 has completely solved the cross-wind takeoff problem. Several takeoffs were accomplished with 90 degree cross-wind components of 20 knots during which no lateral control was used. The use of this device was very straightforward and it is considered an excellent feature.

4. Climb

The aircraft climbed satisfactorily although there is a tendency to overcontrol laterally at high altitude. This condition is aggravated if the aircraft is slightly out of trim laterally. However, this condition is quickly overcome and poses no problem. Visibility in turns during climb is poor because of the overhead structure of the pilot's compartment.

5. Air-to-Air Refueling

A number of aerial refueling contacts were made with KC-97G type tankers. Refueling can be described as somewhat more difficult than with the B-47 but still quite feasible. The difficulty of becoming proficient in refueling can be compared with learning to land an aircraft. Even though one becomes thoroughly proficient, it requires regular practice to stay proficient. Visibility during refueling is marginal. The unilateral seat adjustment (up and forward or down and back) necessitates moving the seat back in order to get it down to permit vision of the tanker. The pilot must lean forward and bend his neck back. This is difficult when the partial pressure suit is worn. Vision through the upper triangular windows is distorted and the fact that the

Nesa Panel does not extend to the top of the forward windows is disconcerting. The pilot director lights on the tanker are located too far aft and should be moved forward and replaced with the new "pinball positioning lights" that indicate the receivers exact position in the refueling envelope.

6. Longitudinal Stability

a. The longitudinal stability of the aircraft is generally satisfactory.

b. The onset of high-speed buffet is largely determined by gross weight and altitude. First buffet occurs at lower Mach numbers as gross weight and/or altitude is increased. For instance, at combat conditions the high-speed characteristics include a slight air frame tremor encountered at 0.84 Mach followed by a pitch-down at 0.86 Mach number. First aileron roughness occurs at 0.88 Mach number and increases as Mach number is increased to 0.91 Mach number. At 0.91 Mach number there is a pitch-up followed by a right wing drop at 0.925 Mach number. At a mid C.G., if the aircraft is trimmed at 0.80 Mach number, full forward stick is reached at 0.925 Mach number if the aircraft is not retrimmed. Maximum level-flight speed is 0.905 Mach number at light weight at 35,000 feet altitude. Since the aircraft was so far up on the drag rise, very steep (for this type aircraft) full power dives were required to obtain Mach numbers above 0.925. The aircraft can be flown at maximum level-flight speed and then dived very steeply without ill effect. The high-speed characteristics are considered excellent for an aircraft of this type.

c. The maneuvering flight characteristics of the B-52 are generally satisfactory. Compared to the B-47 the B-52 has excellent turning characteristics. For example, in the typical bombing configuration 250,000-pound gross weight and 47,500 feet altitude, the brakeway turn after bomb release can be made in edge of buffet at 0.80 Mach at a rate of turn of approximately 2.4 degrees per second. This turn was made holding a constant Mach number and a 45-degree bank angle allowing the altitude to decrease. The average loss of altitude in a 180-degree turn was 1,500 feet.

d. The present stabilizer trim speed (of 0.6 degrees/sec.) is a good compromise between low and high-speed operation. All longitudinal trim changes were reasonable. The most objectionable longitudinal trim changes were during speed brake extension and flap extension. Because of the small elevator both of these operations require that the stabilizer trim actuation be started before the operation is completed to prevent running out of elevator.

e. Clean stalls are generally satisfactory with and without external tanks, power on and power off. In the clean configuration without external tanks there is 10 to 15 knots stall warning in the form of light buffet that increased to heavy buffet just prior to stall. There is a tendency

for the aircraft to roll to the right but this is controllable. In the clean configuration with external tanks installed there is 15 to 20 knots of stall warning with no tendency to roll. This stall warning starts as light buffet, increases to very heavy buffet and a rather violent vertical bounce. Actually it is not practical to do full stalls in this configuration because of the severity of the buffet and the vertical bounce. However, this does not hamper the operation of the aircraft since full stalls are not required. There is certainly sufficient stall warning for inadvertent stall approaches. In the approach and landing configurations there is a marked difference between stalls with and without external tanks. In the power approach and landing configurations with external tanks installed there is 5 to 7 knots stall warning in the form of light buffet that increases to heavy buffet as speed decreased. There is a tendency for the aircraft to roll but this is controllable. In the landing configuration it is possible to hold the stick full back while the nose falls through. The stalling characteristics in the power approach configuration, with external tanks installed are excellent; however, in the power approach aft C.G. configuration without external tanks, what little stall warning exists is masked by flap buffet. There is a marked tendency for the aircraft to roll to the right. This roll can be stopped by full use of lateral control and rudder but the wing cannot be raised again until the nose is lowered. This condition is somewhat better at forward C.G. positions in that elevator response is better. In the landing configuration without external tanks there is 1 to 2 knots stall warning in the form of light buffet and a tendency for the right wing to drop but this condition is not as uncomfortable as in the power approach configuration. The stalling characteristics of the B-52 in the approach and landing configurations without external tanks are quite marginal but not considered dangerous provided the controls are used judiciously. It would be extremely desirable to have the same stalling characteristics without external tanks as are demonstrated with external tanks. Considerable effort has been expended in this direction with the only apparent solution being the installation of a large external fence that extends forward of the wing leading edge. A change of this magnitude and weight is not warranted. The Pilot's Handbook should be modified to describe these undesirable stalling characteristics.

7. Directional Stability

The static directional stability of the B-52 is satisfactory. The aircraft is equipped with a very small rudder that is seldom used in normal flight. Maximum sideslip attainable is 3 degrees. The cross-wind landing gear eliminates the need to sideslip the aircraft. It is possible to maintain complete control with three outboard engines cut off in the takeoff configuration down to 113 knots CAS at 212,000 pounds gross weight, which is more than adequate. This condition was accomplished with full rudder and approximately one-half lateral control. The directional dynamic characteristics were marginal in that if the aircraft were disturbed directionally the oscillations did not dampen out completely in any reasonable length of time. The magnitude

of this oscillation at bombing altitude is quite small and does not adversely affect the bombing problem. However, this condition which is aggravated by rough air makes the tail gunner's task quite difficult. In rough air there is so much directional oscillation that it is impossible for the tail gunner to use many of his controls.

8. Lateral Control

Lateral control is provided by seven spoilers and a small tab-operated aileron on each wing. There is a small amount of buffet that is caused by the spoilers but this is considered undesirable rather than unsatisfactory. The small ailerons contribute very little to the lateral control of the aircraft and could be eliminated. Rate of roll was considered satisfactory for all normal configurations. A detailed description of lateral control in the no-spoiler configuration will be included in the addendum to this report.

9. Cruise

The characteristics of the J-57 engines are such that every change in ambient temperature causes a relatively large change in thrust, and requires a change in throttle setting. The engine pressure ratio instruments proved invaluable in giving an indication of the correct power setting. Prototype E.P.R. gages were used and their reliability was very poor. A prototype Machmeter was utilized throughout the program. This instrument is a servo indicator that operates off the Type C-2 true airspeed computer. It was found that this instrument was actually more sensitive than the airspeed indicator and could be used entirely for cruise control instead of the usual method of computing a different indicated airspeed for each altitude. The readability and repeatability was found to be well within the design specification of ±.002 Mach.

It has long been the practice to cruise an aircraft at 99% of maximum range on the high-speed side of the air miles per pound versus Mach number curve. This appears to have no added value in the case of the B-52 and it is therefore recommended that the aircraft be cruised at 0.775 Mach number instead of the recommended 0.796. In addition to the 60 miles range gained by this procedure, the speed can be varied ±0.02 Mach and the resulting range loss will be 1%. Whereas, if the 99% method is used, an increase in speed of 0.02 Mach will result in 4% loss in range. It was determined that virtually no increase in range was realized by continuing the climbing flight path after leaving the target. This allows the crew to operate without pressure suits which is a distinct advantage. With the present pressure suit it is believed that the restricted vision, and added fatigue renders operation with a pressure suit more dangerous than without one.

10. Let-Downs and Emergency Descents

The maximum landing gear lowering speed is 305 knots. Since the gear produces about twice the drag of the rest of the aircraft, it can be used as a speed brake for descents. There is

a moderate amount of buffeting that accompanies gear-down flight at high speed. The right rear landing gear door shook considerably more than any of the others during all gear-extended flight. This shaking was caused by the air disturbance set up by the right front gear. Although no major failures have been attributed to this deficiency to date, it is believed that some will occur when individual aircraft have acquired more flying time. The spoiler type ailerons can be extended on both wings at the same time, thereby acting as speed brakes. In this case, use of aileron control retracts the spoilers on the wing to be raised rather than raising the spoilers on the wing to be lowered. Considerable pitch-up is encountered as spoilers are extended as speed brakes at high speeds. This requires that the spoilers be extended in steps and the resulting pitch-up be trimmed out. It was determined that the best descent configuration for normal operation and I.F.R. let-downs was power off, speed brakes fully extended, and landing gear retracted. Because the spoilers start to blow down at speeds above 260 knots and have a tendency to blow down unsymmetrically causing the aircraft to roll and yaw, it was determined that 0.75 Mach number down to 36,000 feet and then 260 knots was the recommended let-down speed. This results in a very controllable-feeling aircraft, not too steep a pitch angle, and a rate of descent of 5,000 feet per minute. A high-frequency spoiler shake was encountered on four separate occasions when the spoilers were fully extended at high altitude. This shake occurred at Mach numbers between 0.82 and 0.76. The magnitude was sufficiently severe that on on occasion one of the spoiler segments was torn from the airplane. In all cases it was possible to stop the shake by decreasing airspeed. This condition is not necessarily repeatable and the cause is undetermined at the present time. During simulated emergency descents from high altitudes (above 50,000 feet), it was found that the best procedure was to reduce power to idle, lower the landing gear and then extend the speed brakes in increments while the resulting pitch change was trimmed out. The resulting pitch change caused by speed brake extension is worse at high altitude because of the decreased damping. This situation is aggravated by the fact that lateral control sensitivity is increased with speed brake extension which results in over-controlling laterally during the initial phase of emergency descents. The let-down and emergency descent characteristics of the B-52 were generally good.

11. Approach and Landing

a. The greatest single improvement in the ease of flying the B-52 as compared to the B-47 is the approach. The B-47 is an extremely narrow margin approach-speed airplane, while the B-52 has a greater margin of approach airspeeds because of the rapid bleed off of airspeed and the rapid acceleration characteristics of the J-57 engine. It is still necessary to make adjustments to the approach speed for gross weight and gusty wind conditions.

b. Visibility out of the top of the airplane is very poor. This affects the turn on to final approach and is especially bad when trying to avoid other traffic in congested areas.

Visibility in rain with the installed windshield wipers is unsatisfactory. The windshield wipers do not improve the visibility in any configuration except taxiing. They are an added complication and weight and should be removed from the aircraft. Rain repellent was used with considerable success. The side windows were opened in flight and used for clear vision panels and found to work quite well. There was virtually no air flow either out or in while operating with these windows open. The type of rain repellent that should be used has not yet been determined. When this is resolved and with the aid of the side windows used as clear vision panels, visibility in rain should be satisfactory.

c. Lateral control in the approach configuration is satisfactory. There is a tendency to overcontrol at first because of the increased sensitivity of lateral control caused by speed brake extension; however, this is rapidly overcome with experience. The extremely small rudder which results in ability to sideslip the aircraft is of no consequence because of the cross-wind landing gear.

d. The prepositioning cross-wind landing gear solves the cross-wind problem of the B-52 type aircraft. The gear is set prior to landing and the aircraft is landed with the "crab" in; this results in complete control throughout the landing. The maximum amount of cross-wind that can be coped with, without the cross-wind gear, is 20 knots-90 degrees to the runway and this taxes a pilot's ability. Landings were accomplished with as much as 10 degrees intentional misalignment with nothing more than a slight jolt as the aircraft skipped off the ground and came back down with the landing gear aligned with the runway. There is an erroneous "school of thought" to the effect that if this is possible the aircraft could be operated in this manner to compensate for cross-wind without the cross-wind landing gear. That is, the aircraft could be simply landed in a "crab" to compensate for cross-wind. This is not valid because there is insufficient directional control to handle the aircraft immediately after touchdown and during the first portion of the landing roll while there is very little weight on the wheels. The B-52 is not an operational aircraft without the cross-wind gear.

e. The very small elevator installed on the B-52 dictates that particular attention be paid to trimming out elevator forces while coming down the final approach to assure that sufficient elevator power be available for flare prior to landing. This is particularly true during forward C.G. landings.

f. Emergency go-arounds were simulated with four engines out on one side down to 10 knots above approach speed. It was found that if power was applied slowly go-arounds could be accomplished with 200 feet loss in altitude at normal landing gross weights.

g. A total of twenty-one maximum performance landings were accomplished. These included landings with and without the parachute, with and without speed brakes extended and with and without wing flaps. The landing gross weight varied between 327,000 and 183,000 pounds. Maximum braking was used from immediately after touchdown until the aircraft stopped. Several flat spots and one blown tire on the right rear wheel were caused prior to the time it was

found that the anti-skid detector was wired incorrectly. No other difficulty was encountered with the anti-skid system. This was a vast improvement over earlier performance of this system. This system is still not completely developed in that it is possible to lose all braking during lightweight heeled-over operation at low speeds with the anti-skid system turned on.

12. General Aircraft and System Functioning

a. J57-P-1W Engines

The operation of the J-57 engines was excellent. The entire program for all practical purposes was accomplished with the same set of engines. The only two engines that were damaged were the result of overtemperature. This condition was caused by engine surge at 0.74 Mach number at 55,000 feet altitude. No surge was encountered during normal operation below 50,000 feet altitude. However, surge was encountered when the aircraft was stalled or the throttle advanced rapidly at high altitude. Above 50,000 feet altitude surge was encountered when the aircraft was banked steeply. This condition became more critical with increase in altitude. At 57,000 feet altitude and 0.76 Mach number a 10 degree bank caused two engines to surge and blow out. One of these engines was restarted at 54,000 feet utilizing the rapid restart method. This method entails turning on the ignition and reducing the throttle setting to idle as soon as the engine blows out. In these conditions it was found that the engine would start at any RPM above 63% regardless of altitude. The reason the other engine would not restart was a cracked igniter that prevented complete ignition. Actually a partial start was obtained from the one good igniter but the flame would not spread at this altitude and the engine would not accelerate.

Normal air starts were successful at and below 40,000 feet altitude.

b. The automatic pilot was generally unsatisfactory. A tremendous amount of "trouble shooting" and maintenance was expended before the faulty components, broken wires, etc., were corrected. After this, the program was plagued by design deficiencies such as "rudder creep" and nuisance disengagements. The automatic pilot controls heading through the rudder only and the rudder is so ineffective that the rudder creeps in until rudder limit is reached and the automatic pilot disengages.

c. The failure of one 10-ampere fuse caused the loss of pilot's flight indicator, copilot's flight indicator, copilot's directional gyro, all pressure ratio thrust meters, and all oil cooler flap motors. A Safety of Flight supplement was issued that replaced all of these fuses that could cause this multiple failure with fuses of higher capacity. However, both flight indicators were lost simultaneously on a subsequent occasion. These instruments should be on completely different power sources since basic instrument flight (needle ball) in the B-52 is quite difficult and could easily cause the loss of an aircraft under adverse conditions.

d. A temperature sensing element failure in the pilot's forward windshield was experienced. Since both the pilot's and copilot's forward windshields have a common controller; both windshields become heavily coated with ice during let-down. It was necessary to circle at low altitude for thirty minutes in order to obtain the minimum visibility for landing. The windshields should have completely different circuits to prevent this occurring.

e. ARC 27 (UHF) and ARC 21 (Liaison radio) operation was sub-standard throughout the program. A spare UHF set was installed as an emergency measure.

C. CONCLUSIONS

1. The general handling characteristics of the B-52 are excellent with the exception of the pitch-up that occurs with spoiler application and the lack of stall warning in the approach configuration without external tanks.

2. The performance met or exceeded the contractors estimates with the exception of a range degradation of 8% and a braking deficiency at heavy weight that causes the refusal speed to be decreased by 8% and the critical field length to be increased by 3%.

D. RECOMMENDATIONS

1. It is recommended that:

a. Pressure suits not be worn in the B-52 type aircraft since the restricted vision and added fatigue are more likely to cause an accident than explosive decompression at the present B-52 operational altitudes.

b. The hatch warning system be improved to give positive warning when all hatches are not fully latched and this system should include a means of detecting which hatch is causing the warning system to be activated.

c. Pilots' seats incorporate both forward and aft and up and down adjustment. These seats should be 23 inches wide and incorporate an integrated harness.

d. Automatic pilot operation be improved to provide satisfactory operation.

e. Electrical system be revised to provide completely separate sources of power for pilot's and copilot's flight instruments.

f. Satisfactory windshield anti-icing system operation be provided and the system be rewired to assure that the failure of the pilot's forward windshield will not cause the failure of the copilot's forward wind ield or visa versa.

g. Satisfactory ARC-27 (U.H.F.) and ARC-21 (Liaison) operation be provided.

h. The B-52 be cruised at 0.775 Mach number instead of 0.795.

i. The automatic oil cooler flaps be deleted and a fixed gap be substituted.

j. The windshield wipers be removed and a satisfactory rain repellent be used.

k. The Pilot's Handbook be revised to reflect the stalling characteristics in the approach configuration without external tanks.

l. Reliable engine pressure ratio instruments be installed.

m. The electric servo Machmeter be incorporated in all B-52 type aircraft.

n. A satisfactory means be determined to eliminate speed brake shake.

o. The flap control be spring loaded to the neutral position and a warning horn be installed.

p. A device be installed to actuate knobs, switches and circuit breakers which are difficult to reach.

q. The speed brake control detents be made more positive and a lock be installed to prevent inadvertent operation.

r. A master hydraulic warning light be installed.

s. The order of the hydraulic standby pump switches be changed to group switches with their associated hydraulic packages.

t. The cabin altimeter be moved to the forward instrument panel.

u. The direction of movement of the emergency battery switch be reversed.

v. The medallions on the pilot's and copilot's wheels be modified to hold a takeoff data card.

w. The flip-up type check list at the pilot's and copilot's stations be modified as shown in Figure 4.

x. The ARC-21 (Liaison radio) frequency knob be rotated 90 degrees counterclockwise.

y. The tank-to-engine fuel knobs be painted white as well as changed to push-to-turn type knobs.

z. The emergency landing gear switch guards be modified to prevent guards closing when switches are in the extended position.

a-1 The cross-wind landing gear card be moved to the automatic pilot control box.

b-1 Guards be provided to prevent the instructor pilot from inadvertently kicking the ejection seat handles.

c-1 The water injection lights be changed to indicate a malfunction when the light is on and the color be changed from green to amber.

d-1 The "push to release" type throttle friction brake be investigated for installation in B-52 type aircraft.

A. DISCUSSION OF TEST RESULTS – PERFORMANCE

1. References and Symbol Notation

This section presents in detail the items discussed in the body of the report. Test methods, tables of test results and methods of data reduction used in analyzing the test data are presented in the following discussions:

a. The following publications were used and are referred to in the succeeding discussion:

No. 1 "Flight Test Engineering Manual," USAF Technical Report No. 6273.

No. 2 "A Method of Determining Delta Rate of Climb for Turbo Jet Powered Aircraft." AMC Memorandum Report No. MCRFT 2157.

No. 3 "Specification No. 1638-B, Model J57-P-1 Engine, Pratt and Whitney Aircraft."

No. 4 "Standardization of Takeoff Performance Measurement for Airplanes", AFFTC Technical Note R-12.

b. The following notations are used throughout the succeeding methods of data analysis:

Symbol	Description	Units
AR	Aspect Ratio	Dimensionless
b	Wing Span	Feet
C_L	Lift Coefficient	Dimensionless
C_D	Drag Coefficient	Dimensionless
dh/dt	Apparent Rate of Climb	Ft/Min
e	Airplane Efficiency Factor	Dimensionless
E_t	$(V_{50}^2 - V_{TO}^2)\ /2g$	Feet
F_{gt}	Test Gross Thrust	Lbs.
F_{gs}	Standard Gross Thrust	Lbs.
F_n	Net Thrust	Lbs.
F_g	Gross Thrust	Lbs.

Symbol	Description	Units
ΔF	Net Thrust on a Standard Day at Standard RPM Minus Net Thrust on a Test Day	
g	Acceleration due to Gravity	Ft/Sec^2
Δh	Altimeter Position Error	Feet
K	Temperature Recovery Factor	Dimensionless
$K_t A_j$	Equivalent Nozzle Area	$Feet^2$
L	Lift	Lbs.
M	Mach Number	Dimensionless
P_a	Ambient Air Pressure	"Hg
P_{t_2}	Compressor Inlet Total Pressure	"Hg
P_{t_7}	Total Exhaust Gas Pressure	"Hg
q_c	Impact Air Pressure	"Hg
R/C_s	Standard Day Rate of Climb	Ft/Min
N_{2_s}	Standard Day High Pressure Compressor RPM	RPM
N_{2_t}	Test Day High Pressure Compressor RPM	RPM
R_t	$W_t V_{TO}^2 / 2gS_{g_t}$	Lbs.
R_{a_t}	$W_t (E_t + 50) / S_{a_t}$	Lbs.
S	Wing Area	Ft^2
S_{g_s}	Standard Day Sea Level Ground Dist.	Ft
S_{g_t}	Test Day Ground Distance	Ft
S_{a_s}	Standard Day Sea Level Air Distance to 50 Feet	Ft
S_{a_t}	Test Day Air Distance to 50 Feet	Ft
S_{t_s}	Standard Day, Sea Level Total Distance from Start to 50 Feet or from 50 Feet to Stop	Ft
T_{a_s}	Standard Day Ambient Air Temperature	^oK

Symbol	Description	Units
T_{a_t}	Test Day Ambient Air Temperature	^oK
T_{i_c}	Indicated Free Air Temperature	^oK
t	Time from 50 Feet to Touchdown or from T.O. to 50 Feet	Sec
dE/dt	Rate of Change of Excess Energy	Ft.Lbs/Sec
V_{TO}	Velocity at Takeoff	Ft/Sec
V_{50}	Velocity at 50 Feet	Ft/Sec
V_{td}	Velocity at Touchdown	Ft/Sec
V_w	Velocity of Wind Down Runway	Ft/Sec
V_c	Calibrated Airspeed	Knots
V_e	Equivalent Airspeed	Knots
V_t	True Airspeed	Knots
ΔV	Airspeed Position Error	Knots
W_s	Standard Gross Weight	Lbs.
W_t	Test Gross Weight	Lbs.
ΔW	Standard Minus Test Gross Weight	Lbs.
W_a	Air Flow through Jet Engine	Lbs/Sec
δ	Pressure Ratio (P_a/29.92)	Dimensionless
R	Ram or Duct Efficiency	Dimensionless
σ	Density Ratio ρ/ρ_o	Dimensionless
θ	Temperature Ratio (T_a/288)	Dimensionless

2. Cockpit Evaluation

The cockpit of the B-52 is characterized by simplicity, and the arrangement of the instruments and controls is considered good with the exception of the pilot's and copilot's seat arrangement and the airplane hatch closed indications system which is discussed in detail in the body of the report on Pages 3 and 4. Minor discrepancies in the cockpit that are unsatisfactory and should be corrected are as follows:

a. The wing flap control is located on the right side of the aisle stand aft of the throttles. Because of the crowded space, this control moves in a manner such that its position is is not readily apparent by feel. This lever is inclined 7 degrees to the rear for flaps up, approximately 24 degrees to the rear for neutral, and 35 degrees to the rear for flaps down. Also, the small air foil on the top of the control handle tends to catch in the copilot's seat belt when personnel are changing crew positions in flight. It appears that the best solution to this unsatisfactory situation is to spring load the flap control to the neutral position and leave the present up, down and neutral detents. This will enable a crew member to determine the position of the control during movement by feel. A flap lever modified in this manner was tested and found to be satisfactory. Either deletion of that portion of the air foil type knob that protrudes toward the copilot's seat or a redesigned knob would solve the interference problem with the copilot's seat best. There is no flap warning horn presently installed to warn a pilot of an impending no-flap takeoff. This device has proved quite valuable on other aircraft and the addition of this device is considered warranted.

b. The ten hydraulic package controls are located on the rear of the pilot's side panel. The ten individual hydraulic pack low pressure warning lights are completely out of the pilot's normal field of vision. The pilot must make a specific effort to monitor these lights. Multiple failure of certain packages without the pilot's immediate knowledge could be quite serious. If these ten lights were ganged together to a central light placed adjacent to the hatch open light on the forward instrument panel, it would solve this deficiency. The hydraulic standby pump switches are located so that the outboard switch controls Hydraulic Packages 5, 6, 7 and 8 (spoiler actuation), the middle switch controls Hydraulic Packages 1, 2, 3 and 4 (main landing gear), and the inboard switch controls Hydraulic Packages 9 and 10 (stabilizer actuation). The outboard switch should control Hydraulic Packages 1, 2, 3 and 4 (main landing gear), the center switch should control Hydraulic Packages 9 and 10 (stabilizer actuation), and the inboard switch should control Hydraulic Packages 5, 6, 7 and 8 (spoiler actuation). This would group the standby pumps with their associated hydraulic packages.

c. The cabin altimeter is located on the air conditioning panel at the extreme rear of the copilot's side panel. This instrument should be relocated in the blank space on the main instrument panel below the pilot's direction indicator.

d. The throttle friction lock has nonlinear effectiveness such that when the lock is on sufficiently to prevent the throttles from creeping, it is virtually impossible to move the throttles. This results in the pilot having to unlock the throttles each time a power adjustment is to be made and re-engaging the lock each time he wishes to remove his hand from the throttles. The throttle lock was modified during the program so that it was of the improved configuration and considerable improvement was realized. However, when eight throttles are involved it is quite difficult to obtain sufficient friction on each throttle to prevent creeping and still retain easy movement of all eight throttles together. Something similar to the new type lock that is only unlocked when the knob is moved should be investigated.

e. The water injection lights indicate that the four water pumps are operating. They normally operate during takeoff and go out when the water supply is exhausted. It is essential that the system be drained after use to prevent freezing of the excess water in the lines. The lights should be changed from green to amber and should be illuminated when pressure is low instead of when pressure is normal. This would comply with the requirement that warning lights be out during normal operation and will also serve the purpose of warning the pilot that the system should be drained. The lights should go out when the system is drained after takeoff.

f. The emergency battery switch located on the copilot's forward instrument panel is in the down position normally and in the up position for emergency. This switch should be reversed to comply with the philosophy that all switches should be up for normal operation.

g. It is possible to close the guards on the emergency landing gear switches with the switches in the retracted position. These guards should be modified so that the guards can only be closed when the switches are in the neutral position.

h. The four tank-to-engine fuel knobs are identical to and interspersed with the other knobs on the fuel panel. These knobs were painted white to distinguish them from the other knobs. Later airplanes incorporated a push-to-turn knob to distinguish them, but it is believed that they should be painted white to further distinguish them.

i. The location of the ARC-21 (Liaison radio) on the pilot's side panel was such that the channel numbers were on the forward side of the selector knob and could not be seen. This applied even after the positions of the emergency keyer and the ARC-21 were exchanged. The channel selector knob should be rotated 90 degrees counterclockwise. This will place the channel number on the outboard side of the knob where it can be seen.

j. The cross-wind crab prealignment card is stored in a holder on the side of the aisle stand and is easily misplaced. This card should be affixed to the blank space on the front of the automatic pilot turn and pitch control box. In this position it can be read from either seat. This card should include a notation that control tower winds should be divided by two.

k. The presently installed flip-up type check lists shown in Figure 2 are of very little value. These check lists were modified as shown in Figure 3 and found to be quite useful. It is recommended that the modified check lists shown in Figure 4 be substituted for the ones that are presently installed.

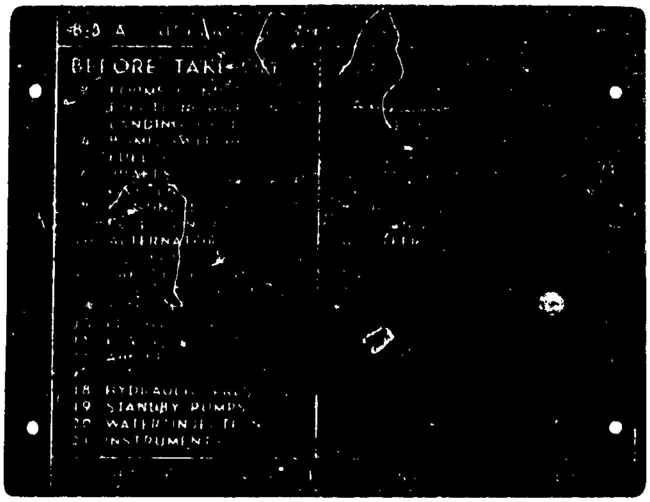

FIGURE 2

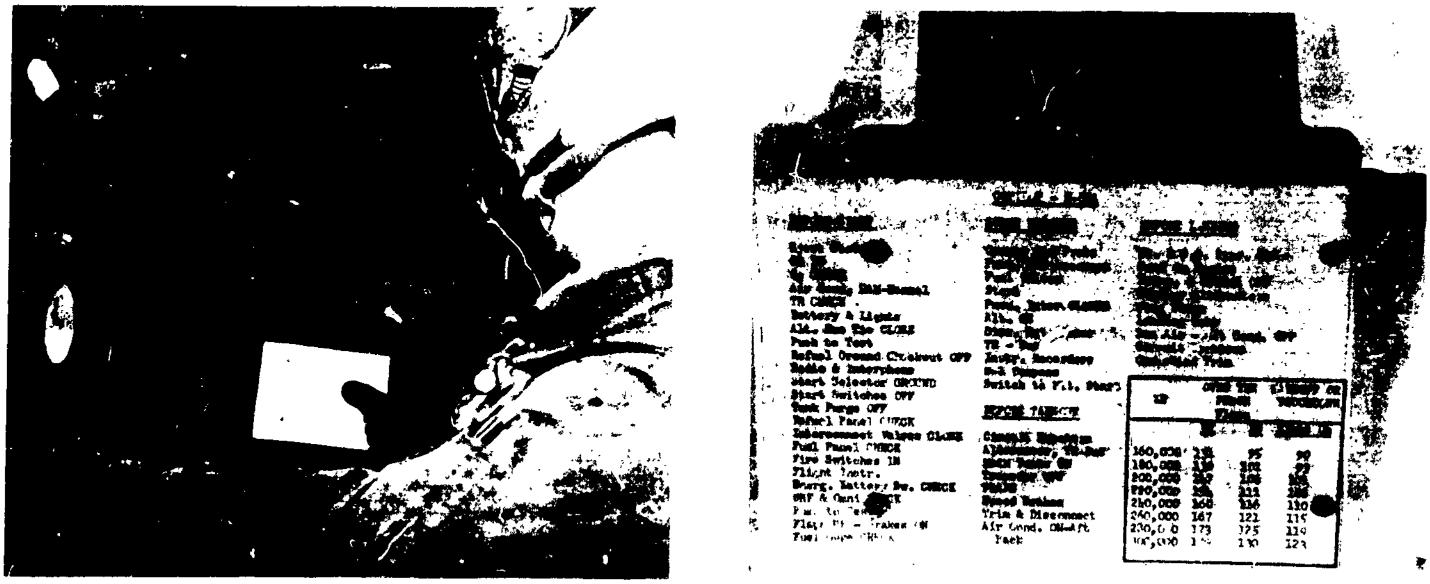

FIGURE 3

PILOT – B-52

BEFORE START

Eject Seats Pins-CHECKED
Circuit Breakers-IN
Hydraulic Packs-OFF
Standby Pumps-ON
Park Brake Press-CHECKED
Water Injection-OFF
Emerg Flaps-CHECK
Emerg Alarm-CHECK
Interphone, Nor & Alt-CKD
Oxy Supply & Press
Auto-Pilot Servos-IN
NESA-OFF
Fire Warning-TEST
Anti-Ice-OFF
Gear Handle-DOWN
Emerg Gear Sw-OFF
Anti-Skid-ON
Steering Ratio-TO & LD
Stab & Ail Trim Cutout-
OFF (GUARDS DOWN)
Throttles-OFF
Control & Trim-CHECKED
Auto-Pilot-CHECK
Crosswind Trim-CHECKED
Brakes-ON

AFTER START

Hydraulic Packs-ON
Stabilizer-CHECKED
Spoilers-CHECKED
Steering-Taxi
Down Locks & By Pass Keys-
REMOVED
Bomb Bay-CLOSE
NESA-ON

BEFORE TAKEOFF

Circuit Breakers-IN
Hydraulic Packs-CHECKED
Hyd Standby Pumps-ON
Anti-Skid-ON
Flaps-DOWN
Flt & Trim Controls-CKD
Speed Brakes-DOWN
Steering-TO & LD
Crosswind Trim-SET
Control Flight-CHECKED
Water-ON

AFTER TAKEOFF

Standby Pumps-OFF
Water System Drained

BEFORE LANDING

Wt & C.G.-CHECKED
Hyd Packs-CHECKED
Standby Pumps-ON
Steering Ratio-TO & LD
Gear-CHECKED, Anti-Skid-
ON
Crosswind Trim-SET
Flaps-DOWN
Speed Brakes

GROSS WEIGHT	FLAPS DWN #2SP–BKS	FLAPS DOWN	FLAPS UP	TOUCHDOWN FLAPS DWN
180,000	109	101	139	96
200,000	114	106	147	101
220,000	120	111	154	106
240,000	125	116	160	110
260,000	130	121	167	115
280,000	135	125	173	119
300,000	140	130	180	123

COPILOT – B-52

BEFORE START

Eject Seat Pins-CHECKED
Circuit Breakers-IN
Oxygen-CHECKED
Air Conditioning-RAM
Battery & Lights-CHECKED
Alt. Bus Tie-CLOSE
External Power-ON
TR Busses-CHECKED
Radios-CHECKED
Start Selector-GROUND
Start Switches-OFF
Tank Purge-OFF
Refuel-OFF
Interconnect Valves-OPEN
Fuel Panel-CHECKED
Flight Instr. -CKD & ON
Flaps-UP
Brakes-ON

START ENGINES

Ground Air Press-ON
Start-5, 6, 7, 8, 4, 3, 2, 1
Pneu. Inter-CLOSED
Alternators-ON
Ext Power-DISCONNECTED
Start Selector Flight

BEFORE TAKEOFF

Circuit Breakers-IN
Alternator, TR-Bus-CKD
Main Tanks - ON
Transfer-OFF
Wing Flaps-DOWN
Speed Brakes-DOWN
Trim & Disconnect-CKD
Air Conditioning-ON

BEFORE LANDING

Wt. & C.G. Appro. IAS-CKD
Tank to Engine-SET
Trans & Refuel-OFF
Monitor Alternators-CKD
Wing Flaps-DOWN
Landing Gear-DOWN
Circuit Breakers-IN
Crosswind Trim-SET

GROSS WEIGHT	FLAPS DWN #2SP–BKS	FLAPS DOWN	FLAPS UP	TOUCHDOWN FLAPS DWN
180,000	109	101	139	96
200,000	114	106	147	101
220,000	120	111	154	106
240,000	125	116	160	110
260,000	130	121	167	115
280,000	135	125	173	119
300,000	140	130	180	123

Figure 4

l. It is possible for the instructor pilot to kick the arming levers of the pilot's and copilot's seats if he stretches his legs out. A guard should be installed on the floor of the aircraft to prevent this happening.

m. The speed brake control is a lever that is located to the left of the throttles. The three detents in this control actuation are not sufficiently positive to be easily recognized. This results in the control lever having to be checked visually each time it is used. Inadvertent operation of this control causes rather violent "pitch-up". A flip-over type latch similar to the one installed on the parachute control or a positive neutral position detent should be incorporated.

n. There are so many controls in the cockpit of the B-52 that short crew members find it virtually impossible to reach the remotely located fuel knobs and circuit breakers. A "Fuel Stick" was installed in the B-52 which proved to be quite valuable. This stick was stowed in clips on the top edge of the copilot's side glare shield. One end is "U" shaped to actuate fuel knobs and the other has a rubber tip to push circuit breakers and switches. The "Fuel Stick" was also found to be valuable for paralleling alternators. This is a two-handed operation which requires that the copilot unlatch his seat belt each time the operation is performed. By using the "Fuel Stick" to reach the switches the copilot may remain strapped in his seat while performing these duties. Automatic paralleling alternators will be available for the B-52 aircraft but not until a considerable time in the future. In the meantime, the "Fuel Stick" is a practical solution. The B-52 type aircraft should be delivered with a "Fuel Stick" installed.

3. Takeoffs

a. Performance takeoffs, to determine the minimum total distance required to take off and climb to 50 feet were made in the clean configuration at gross weights varying from 220,000 pounds to 380,000 pounds, and in the external tank configuration at gross weights varying from 260,000 to 405,000 pounds. Tests were conducted both with and without water injection. Takeoffs were also accomplished utilizing what the pilot considered a normal technique in order to determine ground roll distance required to clear a 50-foot obstacle. All normal takeoffs were made with the stabilizer set at the contractor's recommended normal trim settings, the flaps full down, and the power at 100%. Minimum distance takeoffs were accomplished using full throttle, full-down wing flaps, and full nose-up elevator. One and one-half degrees nose-up trim was added to the contractor's normal stabilizer trim curves on all minimum distance takeoffs. The landing gear was raised as soon as practicable after takeoff but the wing flaps remained full down during climbout. Minimum distance takeoff tests were conducted at the forward C.G. limit at 380,000 pounds and at the aft C.G. limit at 360,000 pounds, as well as at a mid C.G. at both weights. The aft C.G. takeoff performance was found to be comparable in distance to the other takeoffs

made at 360,000 pounds in the mid C.G. condition. The forward C.G. takeoff, however, was 18% longer and the takeoff speed 7 knots IAS faster than the minimum distance required for other 380,000-pound takeoffs. Because of the long ground roll encountered during this forward C.G. takeoff, the pilot had full nose-up stabilizer trim and full nose-up elevator prior to lift-off and the distance was still overly long. One minimum distance takeoff was made with the flaps up at 320,000 pounds gross weight using full nose-up trim. The test data were corrected to the maximum thrust that would be obtained on a no-wind standard day at sea level. The standard day thrust values that were used were 9,500 pounds per engine dry thrust and 10,600 pounds per engine with water injection (8,600 pounds per hour water flow rate) at brake release. These values indicate the thrust that would be obtained with the engine trimmed to the tailpipe exhaust gas pressure (P_{t_7}) that would give an uninstalled static thrust dry of 10,000 pounds and a wet thrust of 11,400 pounds. (See Paragraph C for a more detailed discussion of the trimming procedures used.) The actual thrust values were determined from thrust calibrations of the tailpipe pressure probes made on the AFFTC Universal Thrust Stand at Edwards Air Force Base. The thrust values listed above are for unstabilized engine operation (40 to 60 seconds after full throttle is reached) and are approximately 3% higher than when stabilized for 5 minutes. Because of this, it is recommended that the takeoff roll be commenced as soon as practicable after 100% power is reached to make the most of the additional thrust. Distances will be slightly greater than those listed on the following page if the pilot holds either full power or near full power for any appreciable time over one minute due to the thrust overshoot characteristics of the engine. It was found during the program that the winds and temperatures obtained from the tower would vary as much as 5 to 7 knots and 8 degrees to 9 degrees Centigrade from the actual values measured at the mid point on the runway. The largest variations in temperature occurred on clear warm sunny days. The temperature agreed within 1 to 2 degrees on cool or overcast days. On critical takeoffs it is recommended that the winds and temperature be measured at the runway just prior to takeoff in order to better compute the takeoff conditions. For further details of wind effect on takeoff roll and indicated airspeed, see Paragraph 9.b. of this appendix.

b. The following table is a summary of the average maximum performance takeoff test results corrected to standard day conditions. Curves of these data are also presented in Figures 1 through 4 and include normal takeoff distances for various weights.

MAXIMUM TAKEOFF PERFORMANCE

No Water Injection
No External Tanks

Gross Weight (Lbs.)	Config.	% MAC	Ground Run (Feet)	Total Dist. to 50 Feet (Feet)	IAS @ T.O. (Knots)	IAS @ 50 Ft. (Knots)	V_t (S.L.) @ T.O. (Knots)	V_t (S.L.) @ 50 Ft. (Knots)
220,000	Flaps Dn.	22.1	2,550	3,650	116	131	123	135
260,000	Flaps Dn.	23.5-27	3,200	4,000	118	133.5	125	132
320,000	Flaps Dn.	23.5-27	5,000	6,250	137	143	137	145
320,000	Flaps Up	27	7,400	8,400	165	176	162	164
360,000	Flaps Dn.	23.5-32.4	6,300	7,950	138	151	142	151
380,000	Flaps Dn.	23.5-27	6,700	8,500	146	149	141.5	151
3[illegible]0,000	Flaps Dn.	22	8,100	9,400	153	155	156	157

MAXIMUM TAKEOFF PERFORMANCE

8,600 Pounds Per Hour Water Injection

Gross Weight (Lbs.)	Config.	% MAC	Ground Run (Feet)	Total Dist. to 50 Feet (Feet)	IAS @ T.O. (Knots)	IAS @ 50 Ft. (Knots)	V_t (S.L.) @ T.O. (Knots)	V_t (S.L.) @ 50 Ft. (Knots)
260,000	Flaps Dn.	23.5-27	2,850	3,600	118	130	126.5	134
280,000	Flaps Dn.	22-33	3,300	4,150	122	134	129.5	138
*320,000	Flaps Dn.	23.5-27	4,500	5,600	138	142	138.5	141.5
380,000	Flaps Dn.	23.5-27	6,200	7,250	149	158	147	153.5
*405,000	Flaps Dn.	23.5-27	7,000	8,450	151	160	152	162

* 2- 1,000-Gallon External Tanks Installed

c. Prior to the takeoff test, all engines were adjusted to produce 9,250 pounds of thrust dry at the end of five minutes of 100% power operation. The value of 9,250 pounds thrust was arrived at by subtracting the installation losses from the engine manufacturer's uninstalled static rating (10,000 pounds). The installation losses were taken as 7½% thrust and were based on Boeing Airplane Company tests and predictions of a 5% duct loss. The actual trim values of P_{t_7} were based on the tailpipe pressure probe calibration made at Edwards Air Force Base. Since the J57-P-1 engine specification does not guarantee water injection, the contractor recommended trim procedures and P_{t_7} values (Boeing Document D-10770, Figure 5, Page 72.012.27 and Pratt & Whitney Curve No. 78970 Rev. 6-10-55) were used throughout the wet trim runs. These curves give an installed static thrust of 10,270 pounds per engine with one water pump operating for each two engines.

d. The corrections used to reduce the takeoff data to standard day, sea level conditions were accomplished by use of the following relationships derived in Reference No. 4.

$$S_{g_s} = S_{g_t} \left[\frac{V_{TO} + V_W}{V_{TO}} \right]^{1.85} \frac{\sigma_t / \sigma_s}{\frac{W_t}{W_s} \left[\frac{0.94\, Fgt}{R_t} \left(\frac{W_t}{W_s} \cdot \frac{Fgs}{Fgt} - 1 \right) + 1 \right]}$$

and

$$S_{a_s} = S_{a_t} \frac{\left(\frac{W_s}{W_t} \quad \frac{\sigma_t}{\sigma_s} E_t + 50\right)}{(E_t + 50)\left[\frac{.94\ Fgt}{R_{a_t}}\left(\frac{W_t}{W_s} \quad \frac{Fgs}{Fgt} \quad -1\right) + 1\right]} + V_w$$

4. **Climb Schedule Determination**

a. Level accelerations were conducted to determine the optimum climb schedule to be used on the test aircraft. These tests were flown at 250,000 and 350,000 pounds gross weight in the clean configuration and at 400,000 pounds gross weight with external tanks installed. Military rated thrust and normal rated thrust were used with 8 and 7 engines operating at 10,000, 20,000, 30,000, 40,000 and 45,000 feet altitude. Level accelerations were also conducted with 8, 7 and 6 engines operating at 280,000 pounds gross weight at 5,000 feet with full flaps, flaps and gear, and gear only and at 15,000 feet with full flaps only. The flaps and gear-down accelerations were flown in order to determine the best climbout airspeed in the event the flaps and/or gear would not retract. Whenever possible, at least two level accelerations were run at each condition. Each acceleration was conducted by slowing the aircraft to 20 to 30 knots IAS above stall and accelerating to within approximately 5 knots IAS of maximum speed. The climb speed schedules as determined from the accelerations are slightly faster than the Boeing recommended schedules at low altitudes (under 30,000 feet). Above 30,000 feet, .78 rather than the BAC recommended speed of .8 Mach number was used on all climbs except military rated power at 260,000 pounds. This climb was flown using the BAC recommended schedule of .8 Mach. Under all conditions the speed for maximum rate of climb could be varied considerably and not change the rate of climb more than 1% because of the extremely flat characteristics of the rate of climb or rate of change of energy curves. The climb schedule selected was taken as approximately the speed at which 1% less than the maximum rate of climb would be obtained on the high-speed side of the curve. In order to achieve a climb speed schedule that would be relatively easy to fly (constant V_c or constant Mach number where possible), the value of 1% was varied as much as ±½%.

b. All acceleration data have been corrected to standard day atmospheric conditions and are presented in the form of rate of change of energy (foot pounds per second) versus true airspeed. The rates of climb as determined from the accelerations have been plotted on the appropriate climb performance curves to indicate the validity of the acceleration method of climb schedule determinations. Curves of all accelerations are presented in Figures 34 through 39. The data were reduced by means of the following relations:

$$de/dt = W_t \left[19362\ \theta_a\ (M_2^2 - M_1^2) + (H_{p2} - H_{p1}) \right] + 101.2\ V_t\ \Delta F_n \qquad T_{a_s}/T_{a_t}$$

Thrust data for these corrections were obtained from Reference No. 3. The derivation of this method is outlined in Reference No. 1. Since the fuel control unit of the J57-P-1 engine maintains a predetermined schedule of engine RPM (N_2) with respect to compressor inlet temperature, it was necessary to determine this schedule. Data from full throttle climbs were used to determine this RPM temperature schedule. These data appear in the form of a speed bias curve in Figures 203 through 207, N_2 being plotted versus compressor inlet temperature. The accelerations were corrected to this standard day RPM by means of the thrust corrections listed above. Weight corrections were applied by the use of the following equations which are presented in Reference No. 1.

$$\Delta de/dt_1 = de/dt_S \ x\Delta W = \Delta \text{ rate of change of energy for } \Delta W \text{ at constant power}$$

$$\Delta de/dt_2 = \frac{19010 \ \Delta W W_t}{V_c \sigma^{1/2} e b^2} = \Delta \text{ rate of change of energy for induced drag because of } \Delta W$$

Note: Subscripts "t" and "s" refer to test day and standard day conditions, respectively.

5. Climbs

a. Check climbs were flown on all test flights that required climbing to an altitude of 35,000 feet or higher. As a result it was possible to obtain climb data over a weight range varying from 220,000 to 406,000 pounds engine start weight without any penalty in test time. Climbs were flown at military rated thrust (approximately 1% N_2 RPM less than takeoff thrust) and normal rated thrust (approximately 3% N_2 RPM less than takeoff thrust) with 8 engines and 7 engines operating. Wherever practicable, at least two climbs were flown under the same weight-power-speed schedule conditions. Climbs were also flown at the same weight-power conditions at both the contractor's recommended speed schedule and the speed schedule as determined from level accelerations. As noted in the discussion of climb schedule determination, little difference in time to climb or fuel used is realized using one speed schedule over another. However, it is apparent from the following tables that a slight advantage can be obtained in fuel used per mile of climb when the climb speed schedule based on the level accelerations is used. For instance, at an engine start weight of 260,000 pounds the average nautical air miles per pound of fuel used from sea level to 50,000 feet on a military rated power climb is .0139 using the contractor's speed schedule and .0142 when flying the Phase IV recommended speed schedule. For an engine start weight of 360,000 pounds on a military rated thrust climb, the contractor's schedule gave .0112 nautical air miles per pound as compared to .0113 for the Phase IV schedule at 40,000 feet. It should be pointed out, however, that some of this fuel would be expended in accelerating to the higher climb speed schedule prior

to the start of the climb when using the Phase IV schedule. It is felt that either schedule could be used with practically the same results. All climb data have been corrected to standard day atmospheric conditions and limit exhaust gas temperature. (In all cases the corrected average exhaust gas temperature was lower than the limit temperature.) The climb data are presented in Figures 7 through 23 and plots of approximate fuel used and time allowance from brake release to best climb speed are shown in Figures 5 and 6. To obtain the fuel used from engine start to engine runup prior to brake release, an eight-engine consumption rate of 150 pounds per minute may be used. A summary of the climb performance data is presented in the following tables:

EIGHT-ENGINE CLIMB PERFORMANCE

Military Rated Thrust
Climb Speed Schedule Determined from Level Accelerations
No External Tanks

(1) Gross Weight at Engine Start, Approximately 220,000 Pounds

Altitude Feet	R/C Ft/Min	T/C Min	N_1 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	5,900	0	99.7	2.10	0	0	217,000	340
10,000	5,120	1.7	99.0	2.33	1,700	11.0	215,300	380
20,000	4,200	3.9	98.2	2.50	3,400	25.0	213,600	440
30,000	3,150	6.6	96.8	2.70	5,050	46.0	212,000	455
40,000	2,400	10.1	96.0	2.80	6,600	73.0	210,400	450
50,000	925	16.3	95.9	2.85	8,400	120.0	208,600	445
*54,500(SC)	100	21.2	95.9	2.90	10,900	194.0	206,100	445

* Extrapolated data

SC Service ceiling

(2) Gross Weight at Engine Start Approximately 260,000 Pounds

Altitude Feet	R/C Ft/Min	T/C Min	N_1 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	4,950	0	99.6	2.15	0	0	253,300	340
10,000	4,400	2.1	99.2	2.35	2,100	13.0	251,200	380
20,000	3,850	4.5	98.2	2.45	4,000	29.0	249,300	435
30,000	3,090	7.3	97.0	2.70	5,700	50.0	247,600	460
40,000	1,800	11.5	96.1	2.75	7,500	83.0	245,800	460
50,000(SC)	100	23.4	95.9	2.80	11,100	172.0	242,200	445

(3) Gross Weight at Engine Start Approximately 360,000 Pounds

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	3,300	0	99.9	2.10	0	0	352,200	340
10,000	2,800	3.3	99.1	2.30	3,050	20.0	349,200	375
20,000	2,200	7.3	98.1	2.45	6,150	45.0	346,100	415
30,000	1,600	12.7	96.8	2.65	9,250	83.0	342,900	450
40,000	650	20.9	95.8	2.75	12,750	144.0	339,400	440
*43,500(SC)	100	30.0	95.7	2.80	16,500	220.0	335,700	440

* Extrapolated data

SC Service ceiling

(4) Gross Weight at Engine Start Approximately 405,000 Pounds

Two 1,000-Gallon External Tanks Installed

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	2,950	0	99.8	2.05	0	0	394,000	345
10,000	2,450	3.7	99.1	2.25	3,350	23.0	390,600	385
20,000	1,900	8.3	98.2	2.40	6,800	54.0	387,200	425
30.000	1,250	13.7	96.8	2.60	10,600	102.0	383,400	445
40,000	300	25.6	96.0	2.75	15,700	191.0	378,300	450
41,000(SC)	100	30.0	96.0	2.76	17,500	250.0	376,500	450

SC Service ceiling

EIGHT-ENGINE CLIMB PERFORMANCE

Military Rated Thrust
Contractor Estimated Climb Speed Schedule
No External Tanks

(5) Gross Weight at Engine Start Approximately 220,000 Pounds

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	5,750	0	99.7	2.20	0	0	217,900	300
10,000	4,950	1.9	98.8	2.40	1,700	10.0	216,200	340
20,000	4,000	4.1	97.4	2.61	3,400	23.0	214,500	375
30,000	3,300	6.9	96.3	2.75	5,000	41.0	212,900	415
40,000	2,400	10.3	96.0	2.84	6,500	67.0	211,400	455
50,000	750	17.4	95.9	2.85	8,600	120.0	209,300	450
54,000(SC)	100	26.0	95.8	2.80	10,900	185.0	207,000	445

SC Service ceiling

(6) Gross Weight at Engine Start Approximately 260,000 Pounds

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	4,850	0	99.8	2.20	0	0	253,300	300
10,000	4,100	2.2	98.8	2.45	2,050	12.0	251,200	345
20,000	3,300	4.9	98.0	2.60	4,050	28.0	249,200	405
30,000	2,600	8.3	96.8	2.70	6,000	52.0	247,300	460
40,000	1,950	12.6	96.0	2.80	7,850	85.0	245,400	450
*50,000(SC)	100	24.7	96.0	2.82	11,250	178.0	242,000	450

* Extrapolated data

SC Service ceiling

(7) Gross Weight at Engine Start Approximately 360,000 Pounds

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	3,225	0	99.8	2.20	0	0	352,300	315
10,000	2,750	3.2	99.0	2.40	3,050	18.0	349,300	360
20,000	2,150	7.3	98.0	2.58	6,100	44.0	346,200	420
30,000	1,600	12.8	96.8	2.70	9,400	85.0	342,900	465
*40,000	700	21.1	96.0	2.70	13,350	150.0	339,000	455
*43,500(SC)	100	29.5	96.0	2.70	17,000	230.0	335,300	450

* Extrapolated data

SC Service ceiling

(8) Gross Weight at Engine Start Approximately 390,000 Pounds

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
..	2,900	0	99.8	2.16	0	0	382,200	320
10,000	2,400	3.7	98.8	2.35	3,350	21.0	378,400	365
20,000	1,900	8.3	98.0	2.50	6,800	51.0	375,400	420
30,000	1,390	14.6	97.0	2.70	10,500	99.0	371,700	470
*40,000	100	31.5	95.9	2.75	18,000	220.0	364,200	430
*42,000(SC)	100	31.5	95.9	2.75	18,000	220.0	364,200	425

* Extrapolated data

SC Service ceiling

EIGHT-ENGINE CLIMB PERFORMANCE

Normal Rated Thrust
Climb Speed Schedule Determined from Level Accelerations
No External Tanks

(9) Gross Weight at Engine Start Approximately 260,000 Pounds

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	3,900	0	97.7	2.0	0	0	253,300	310
10,000	3,400	2.7	96.8	2.15	2,300	15.0	250,900	360
20,000	2,850	5.9	95.8	2.28	4,500	36.0	248,800	415
30,000	2,200	9.9	94.6	2.45	5,500	65.0	246,800	445
40,000	1,250	15.3	93.7	2.56	8,450	105.0	244,900	435
*48,300(SC)	100	27.0	93.6	2.57	12,500	210.0	240.800	425

* Extrapolated data

SC Service ceiling

(10) Gross Weight at Engine Start Approximately 360,000 Pounds

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	2,500	0	97.8	1.95	0	0	352,200	335
10,000	2,100	4.3	96.9	2.10	3,700	26.0	348,500	370
20,000	1,700	9.6	95.8	2.25	7,150	61.0	345,100	410
30,000	1,200	16.4	94.6	2.33	10,700	110.0	341,500	440
40,000	500	27.7	93.5	2.45	14,850	192.0	337,400	430
*42,500(SC)	100	33.5	93.3	2.47	16,500	240.0	335,700	425

* Extrapolated data

SC Service ceiling

(11) Gross Weight at Engine Start Approximately 405,000 Pounds

Two 1,000-Gallon External Tanks Installed

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	1,850	0	97.8	1.92	0	0	394,000	330
10,000	1,600	5.8	96.7	2.03	4,550	34.0	389,500	410
20,000	1,300	13.0	95.7	2.19	9,000	80.0	385,000	425
30,000	800	23.4	94.4	2.38	14,150	152.0	379,900	430
39,000(SC)	100	42.0	93.5	2.50	22,000	280.0	372,000	430

SC Service ceiling

SEVEN-ENGINE CLIMB PERFORMANCE

Military Rated Thrust
Climb Speed Determined from Level Accelerations
No External Tanks

(12) Gross Weight at Engine Start Approximately 260,000 Pounds

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	3,700	0	99.6	2.10	0	0	253,300	312
10,000	3,100	2.9	99.0	2.30	2,250	16.0	251,000	360
20,000	2,450	6.5	98.2	2.45	4,600	39.0	248,700	418
30,000	2,200	10.9	97.0	2.60	6,950	72.0	246,400	460
*40,000	1,300	16.5	95.8	2.70	9,250	114.0	244,100	440
*48,900(SC)	100	33.0	95.8	2.80	15,000	238.0	238,100	440

* Extrapolated data

SC Service ceiling

(13) Gross Weight at Engine Start Approximately 360,000 Pounds

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	2,650	0	99.8	2.10	0	0	352,200	335
10,000	2,200	4.1	99.0	2.25	3,250	24.0	349,000	370
20,000	1,650	9.3	98.0	2.40	6,650	57.0	345,600	405
30,000	1,100	16.9	96.7	2.60	10,600	111.0	341,600	440
*40,000	200	31.9	95.7	2.80	16,000	219.0	336,200	425
*41,500(SC)	100	40.0	95.7	2.81	18,500	280.0	333,700	420

* Extrapolated data

SC Service ceiling

(14) Gross Weight at Engine Start Approximately 260,000 Pounds

Normal Rated Thrust

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	2,375	0	97.6	1.95	0	0	253,300	300
10,000	2,175	4.3	96.7	2.10	2,600	23.0	250,700	340
20,000	1,900	9.1	95.6	2.28	5,100	52.0	248,200	400
30,000	1,500	14.8	94.2	2.40	7,400	91.0	245,900	395
*40,000	625	25.1	93.0	2.50	10,600	157.0	242,800	385
*45,500(SC)	100	38.0	93.0	2.54	14,500	250.0	238,800	380

* Extrapolated data

SC Service ceiling

b. Climbs were flown with gear and flaps down to determine the climbout performance if the gear or flaps failed to retract. Though climbs were much slower than the clean configuration tests due to the external drag items extended, the performance is considered satisfactory. The results of these tests are presented graphically in Figures 21 through 23 and are tabulated in the tables below:

CLIMB PERFORMANCE WITH FLAPS AND/OR GEAR EXTENDED

Military Rated Power
280,000 Pounds Average Gross Weight

(15) Gear extended, 8 engines

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	2,600	0	99.5	2.20	0	0	280,000	215
5,000	2,360	2.0	98.7	2.33	2,000	7.6	280,000	235
10,000	2,090	4.2	98.1	2.40	3,900	16.8	280,000	255
15,000	1,750	6.8	97.5	2.52	5.850	28.3	280,000	275
20,000	1,610	10.0	96.8	2.56	8,000	43.4	280,000	295

(16) Gear and Flaps extended, 8 engines

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	1,750	0	99.4	2.25	0	0	280,000	170
5,000	1,540	3.0	98.7	2.33	2,800	8.6	280,000	185
*10,000	1,275	6.6	98.1	2.40	5,700	19.3	280,000	200
*15,000	960	11.0	97.5	2.52	8,950	33.5	280,000	215
*20,000	640	12.2	96.8	2.60	13,100	55.9	280,000	230

* Extrapolated data

(17) Flaps extended, 8 engines

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	2,150	0	99.4	2.25	0	0	280,000	170
5,000	2,050	2.4	98.7	2.33	2,200	7.1	280,000	185
10,000	1,800	5.0	98.1	2.38	4,350	15.4	280,000	200
15,000	1,440	8.1	97.5	2.50	6,600	25.7	280,000	215
20,000	1,050	12.1	96.8	2.65	9,350	40.4	280,000	230

(15) Flaps Extended, 6 Engines

Altitude Feet	R/C Ft/Min	T/C Min	N_2 %RPM	EPR	Fuel Used (Pounds)	Naut. Miles Traveled	Gross Weight (Pounds)	TAS (Knots)
S.L.	1,150	0	99.4	2.25	0	0	280,000	170
5,000	1,090	4.4	98.7	2.33	4,150	13.3	280,000	185
10,000	850	9.7	98.1	2.38	8,450	30.0	280,000	200
*15,000	500	16.8	97.5	2.50	13,600	53.8	280,000	215
*20,000(SC)	100	32.2	96.8	2.65	24,100	110.0	280,000	230

* Extrapolated data

SC Service ceiling

c. All climb data have been corrected to standard day atmospheric conditions. Prior to starting the climb tests the engines were trimmed to a tailpipe pressure that would deliver take off rated thrust at full throttle. The procedures used in determining the tailpipe pressure to be used and the methods used for trimming are discussed in Paragraph 2-c of this appendis. Because of the predetermined RPM – inlet temperature schedule, bias curve, (discussed in Paragraph 3) all test rates of climb were corrected to the RPM that would have been obtained on a standard day at the test day Mach number. Since the average tailpipe temperatures remained well under the published limits it was not necessary to make any tailpipe temperature corrections. The climbs were corrected by the use of the following relations:

$$R/C_{std} = dh/dt \quad \sqrt{T_{a_t}/T_{a_s}} \quad \frac{101.2V_t \, \Delta F_n}{W_t} \quad \sqrt{\frac{T_{a_s}}{T_{a_t}}}$$

Thrust data for these corrections were obtained from Reference No. 3. The derivation of this method is outlined in Reference No. 2 Weight corrections were applied by use of the following equations which are presented in Reference No. 1:

$\Delta R/C_1 = d_h/d_t \times \Delta W/W_t$ = Rate of climb change for ΔW at constant power

$\Delta R/C_2 = \dfrac{19010\Delta W}{V_c \sigma 1/2eb^2}$ = Rate of climb change due to change in induced drag because of ΔW

6. LEVEL FLIGHT

a. Performance data were obtained in level flight at altitudes ranging from 13,000 to 55,000 feet, gross weights varying from 200,000 to 370,000 pounds, with and without 1,000-gallon external tanks and with various engine combinations ranging from three to eight-engine operation. Power required and drag data were obtained at low altitude with the gear down, and flaps down,

gear and speed brakes extended, gear and flaps and speed brakes extended, gear and flaps and speed brakes 1/3 extended, and flaps fully extended. Speed-power and range information were also obtained with the tip gear extended, bomb bay doors open and with the oil cooler flaps full open. All speed power tests were corrected at even altitudes and even weight-over-pressure ratios (W/δ) rather than at weights that would be obtained at each respective altitude on check climbs. The oil coolers were operated at a fixed gap of 0.2 inches during all speed-power tests except the speed-power polar conducted to determine the effect of oil cooler gap. All data have been corrected to NACA standard day conditions at gross weights, and altitudes to give even weight-over pressure ratios (W/δ) and are presented in the following tables. It will be noted that all RPM data are presented in terms of per cent RPM. This was necessary as no two J57-P-1 engines have the same trim RPM. A value of 100% RPM was chosen as that RPM which would trim the engine to a tailpipe pressure (P_{t_7}) that would deliver installed rated thrust after 5 minutes of static operation on a sea level standard day. (See Paragraph 3.c. in this appendix for detailed discussion of trim procedure.) Maximum speed data are presented in Figure 41 for the clean and external tank configurations with 8 engines operating. No measurable difference could be determined at maximum speed with tanks on and tanks off. This is because the aircraft is so far up on the drag rise at maximum speed that the increment of drag caused by external tanks is small enough to be masked within the measuring ability of the test instrumentation. Consequently, one maximum speed plot only is presented. These data are summarized in the following table:

MAXIMUM STANDARD DAY SPEED

Gross Weight pounds	Altitude feet	True Airspeed knots	Mach No.
200,000	25,000	538	.896
200,000	30,000	532	.907
200,000	35,000	523	.911
200,000	40,000	517	.900
200,000	45,000	510	.888
200,000	50,000	496	.863
200,000	55,000	460	.800
240,000	25,000	538	.896
240,000	30,000	531	.906
240,000	35,000	522	.909
240,000	40,000	514	.894
240,000	45,000	502	.873
240,000	50,000	476	.828
320,000	25,000	538	.896
320,000	30,000	529	.904
320,000	35,000	511	.902
320,000	40,000	503	.875
320,000	45,000	474	.825
360,000	25,000	537	.895
360,000	30,000	527	.898
360,000	35,000	511	.889
360,000	40,000	491	.854
360,000	45,000	441	.767

b. (1) Curves of nautical air miles per pound of fuel and range factor (weight x nautical miles per pound) are presented in Figures 43 through 72 for eight-engine operation clean, with tanks, with bomb bay doors open, with both tip gear down, and with oil cooler flaps full open, and in the clean configuration with seven, six, five, four, and three engines operating. Summary plots of aircraft range capabilities and plots of optimum weight-over pressure ratio for eight engines with and without tanks are presented in Figures 73 through 75. Analysis of the data indicates that the maximum range can be obtained by flying at a weight-over pressure ratio (W/δ)of 1,700,000 with 8 engines operating at all times. However, the W/δ may varied from 1,600,000 to 1,800,000 pounds with no preceptible range loss (under .5%). From the summary plot of range capabilities shown in Figure 73 it can be seen that very little penalty is suffered if a mission is flown at the optimum W/δ to 45,000 feet and then held at 45,000 feet for the remainder of the flight. For example, the decrease in optimum range at 200,000 pounds at 45,000 feet is only 1.4% under the optimum W/δ of 1,700,000 pounds at 49,300 feet. Since flying at a constant W/δ requires a cruise

climb procedure where a rate of climb of an average of approximately 17 feet per minute is required, the actual nautical air miles traveled is .75% less than for stabilized level flight at constant altitude. By deducting this cruise climb penalty from the 1.4% loss, it can be seen that .65% range loss is all that is incurred when flying at a constant altitude of 45,000 feet. On a 6,000-mile mission, roughly half would be flown at constant W/δ and half at constant altitude. Therefore, a total loss in range of 20 miles would be realized on the last half of the mission or a 10-mile loss in radius, which is insignificant. Unless a specific range problem demands it, it is recommended that the cruise altitude be held to approximately 45,000 feet. By doing this pressure suits are not required and crew fatigue would be much less as well as the crew being much more comfortable. Because of the rapid decrease in nautical air miles per pound of fuel with increase in speed from the recommended optimum cruise Mach number it is recommended that the B-52 aircraft be cruised at optimum speed rather than at recommended speed. The optimum cruise speed is defined as that speed at which the maximum nautical air miles per pound can be obtained for a given weight-altitude condition. The recommended cruise speed as defined in Air Force Specification MIL-C-5011A as airspeed for long-range operations, is that speed at which 1% less than the maximum range can be obtained on the high-speed side of the range curves. From Figure 42 it can be seen that the aircraft can be cruised approximately ±.02 Mach number from optimum cruise speed and suffer no more than a 1% decrease in range. However, if a pilot inadvertently cruised .02 Mach number above recommended cruise speed he will suffer 4% loss in range, and the effect of speed on range becomes proportionally more detrimental as the speed is increased. It was found that the specific fuel consumption of the engines increased with altitude rather than remained constant as originally predicted by the contractor. If the specific fuel consumption of the engines remains constant, the range factor of the aircraft will remain constant for a given W/δ. It can be seen from Figure 75 (range factor versus W/δ for cruise conditions at 40,000, 45,000 and 50,000 feet) that the range factor is 7% less at 50,000 feet than at 40,000 feet. The contractor is aware of this discrepancy and has made an appropriate correction to the handbook figures which agree with the Phase IV data at 40,000 and 45,000 feet and are within 1% of the Phase IV data at 50,000 feet. All data were obtained using an oil cooler gap of 0.2 inches open and JP-4 fuel was used on all tests. All speed-power tests were flown with the 4 pneumatic-driven alternators and 6 hydraulic packs operating. The range data are summarized in tabular form in the following tables:

EIGHT-ENGINE CRUISE PERFORMANCE

No External Tanks

W/δ x 10-⁶ lbs.	Alt. 1,000 ft.	Gross Weight lbs.	Optimum Cruise Mach No.	Optimum Cruise TAS kts.	Optimum Cruise EPR	Optimum Cruise Range Factor Wt x Mi / lb.	Optimum Cruise NAM / lb.	Recommended Cruise Mach No.	Recommended Cruise TAS kts.	Recommended Cruise EPR	Recommended Cruise Range Factor Wt x Mi / lb.	Recommended Cruise NAM / lb.
.4	15	225,700	.525	329	1.43	4,300	.0191	.590	369	1.50	4,270	.0189
.8	30	237,300	.675	398	1.73	6,900	.0290	.745	439	1.80	6,790	.0288
1.2	35	282,300	.735	423	1.94	8,320	.0295	.770	448	1.97	8,280	.0293
1.6	37	341,920	.777	447	2.20	9,150	.0268	.795	457	2.22	9,050	.0265
1.6	40	296,320	.777	447	2.20	8,950	.0301	.795	457	2.22	8,770	.0298
1.6	45	233,000	.777	447	2.20	8,550	.0369	.795	457	2.22	8,410	.0364
1.6	48	202,240	.777	447	2.20	8,330	.0413	.795	457	2.22	8,250	.0410
1.8	40	333,360	.775	446	2.34	9,050	.0272	.800	460	2.38	8,930	.0268
1.8	45	262,700	.775	446	2.34	8,840	.0336	.800	460	2.38	8,720	.0332
1.8	50	206,820	.775	446	2.34	8,490	.0410	.800	460	2.38	8,390	.0405
2.0	45	291,900	.790	454	2.52	8,550	.0292	.803	459	2.52	8,470	.0289
2.2	52	229,680	.775	446	2.76	7,880	.0344	.785	452	2.77	7,830	.0342
2.2	55	199,080	.775	446	2.76	7,650	.0383	.785	452	2.77	7,600	.0380

(2) Tests were flown with two 1,000-gallon tanks installed at altitudes ranging from 37,000 feet to 45,000 feet. The results of these tests indicate that an average range penalty of 2.2% is suffered as compared to the clean configuration. The same W/δ of 1,700,000 as used in the clean configuration may be used to obtain best range with tanks on. A summary of the tanks on range performance is as follows:

EIGHT-ENGINE CRUISE PERFORMANCE

Two 1,000-Gallon External Wing Tanks

W/δ x 10-⁶ lbs.	Alt. 1,000 ft.	Gross Weight lbs.	Optimum Cruise Mach No.	Optimum Cruise TAS kts.	Optimum Cruise EPR	Optimum Cruise Range Factor Wt x Mi / lb.	Optimum Cruise NAM / lb.	Recommended Cruise Mach No.	Recommended Cruise TAS kts.	Recommended Cruise EPR	Recommended Cruise Range Factor Wt x Mi / lb.	Recommended Cruise NAM / lb.
1.6	37	341,920	.780	449	2.22	8,870	.0260	.800	460	2.25	8,750	.0257
1.6	40	296,320	.780	449	2.22	8,700	.0295	.800	460	2.25	8,590	.0292
1.7	37	363,290	.780	449	2.28	9,140	.0252	.800	460	2.31	9,030	.0249
1.8	38	358,200	.785	452	2.40	8,670	.0243	.805	463	2.42	8,640	.0241
1.8	40	333,360	.785	452	2.40	8,700	.0262	.805	463	2.42	8,580	.0259
2.0	40	370,400	.785	452	2.58	8,490	.0230	.805	463	2.62	8,430	.0225
2.0	45	291,600	.785	452	2.58	8,280	.0284	.805	463	2.62	8,190	.0281

(3) Tests were flown to determine the effect of extended tip gears and open bomb bay doors upon range. It was determined that there is a 10% and 7.9% loss in range for tip gear extended and bomb bay doors, respectively. The same cruise procedures outlined for the clean and tank configuration may be used to obtain maximum range with both tip gear and bomb doors extended. A comparison table is presented below for the range data and in Figures 57 through 60:

EIGHT-ENGINE CRUISE PERFORMANCE

Both Tip Gear Extended

			Optimum Cruise					Recommended Cruise				
W/δ x × 10⁻⁶ lbs.	Alt. 1,000 ft.	Gross Weight lbs.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.
1.8	40	333,360	.760	437	2.50	8,140	.0244	.780	449	2.53	8,040	.0241
*1.8	40	333,360	.775	446	2.34	9,050	.0272	.800	460	2.38	8,930	.0268

* Clean – 8 Engines

EIGHT-ENGINE CRUISE PERFORMANCE

Bomb Bay Doors Open

			Optimum Cruise					Recommended Cruise				
W/δ x × 10⁻⁶ lbs.	Alt. 1,000 ft.	Gross Weight lbs.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.
1.6	40	296,320	.785	452	2.36	8,180	.0277	.801	461	2.38	8,100	.0275
*1.6	40	296,320	.777	447	2.20	8,950	.0301	.795	457	2.22	8,770	.0298
1.8	40	333,360	.785	452	2.48	8,260	.0251	.801	461	2.51	8,100	.0248
*1.8	40	333,360	.775	446	2.34	9,050	.0272	.800	460	2.38	8,930	.0268

* Clean – 8 Engines

(4) The effect of oil cooler gap upon range was investigated at 50,000 feet by opening the oil coolers to the maximum gap of 2.0 inches. The data show a 5.9% decrease in range with oil coolers full open as compared with a 0.2-inch gap. Based on the results of cooling tests conducted in the Phase II program of the XB-52 Airplane, and from the observation that during the entire Phase IV program the oil cooler gap never exceeded .2 inches while on automatic operation, it is recommended that the automatic cooler be deleted as a weight-reduction item in favor of a fixed gap type cooler. The altitude ranged from 15,000 feet to 57,000 feet with the temperature as high as 10 degrees Centigrade hotter than standard day conditions. A comparison of these conditions is presented in Figures 51 and 52 and in the following table:

EIGHT-ENGINE CRUISE PERFORMANCE

Oil Coolers Full Open (2.0 Inches)

			Optimum Cruise					Recommended Cruise				
$W/\delta \times 10^{-6}$ lbs.	Alt. 1,000 ft.	Gross Weight lbs.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.
*1.8	50	206,820	.775	446	2.45	8,000	.0386	.800	460	2.49	7,880	.0382
**1.8	50	206,820	.775	446	2.35	8,490	.0410	.800	460	2.38	8,390	.0406

* Oil Coolers Full Open (2.0 Inches)
** Oil Coolers 0.2 Inches Open

b. (5) Speed-power tests were flown with 7, 6, 5, 4 and 3 engines operating and with asymmetrical power conditions with 6 engines and 4 engines operating. The results of these data indicate that for 7 engines and 6 engines the average decrease in range is 2.7% and 4.8%, respectively. A direct comparison of the range penalty with 5, 4 and 3 engines operating is not made since these tests were flown at lower weight-over pressure ratios than the 6, 7 and 8 engine tests because of the airplane being power limited with fewer engines operating. From examination of the data it appears that the range loss is approximately 2.5% per engine shutdown. Also the optimum cruise W/δ with reduced engines is not changed for 1 engine off but decreases to 1,600,000 with 2 engines cut off, 1,400,000 pounds with 3 engines cut off and thereafter the best range will be obtained if the aircraft is flown as high as cruise speeds can be maintained. Five investigations were conducted to determine the effects of asymmetric power on range. Two tests were conducted at 40,000 and 45,000 feet with 6 engines operating with the two outboard engines on the same side shut down. No appreciable decrease in range was found over the tests conducted at the same conditions with 6 engines operating symmetrically. Tests were conducted at 20,000, 30,000 and 35,000 feet, respectively, with 4 engines operating symmetrically and with all engines shut down on one side. These tests indicated an additional range penalty of 12.4% at 20,000 feet, 2.5% at 30,000 feet and 1% at 35,000 feet over symmetrical operation. As long as the aircraft can be trimmed for straight-and-level flight without using enough aileron trim to start extending the spoilers, there is little or no range loss as was the case with 6 engines at 40,000 feet and 45,000 feet. However, when more trim is required to fly the aircraft as is necessary with 4 engines out on one side at 20,000, 30,000 and 35,000 feet, the spoilers come up and more drag results causing the range loss. The reduced engine speed power range data are presented in Figures 61 through 72 and are summarized in the following tables:

SEVEN-ENGINE CRUISE PERFORMANCE

No External Tanks

			Optimum Cruise					Recommended Cruise				
W/δ × 10⁻⁶ lbs.	Alt. 1,000 ft.	Gross Weight lbs.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.
1.6	37	341,920	.750	431	2.42	8,850	.0259	.777	447	2.45	8,770	.0257
1.7	40	314,800	.760	437	2.49	8,870	.0281	.785	452	2.52	8,790	.0279
1.8	45	262,440	.775	446	2.58	8,650	.0329	.810	466	2.64	8,450	.0326
1.9	42	319,770	.770	443	2.68	8,640	.0270	.790	454	2.70	8,530	.0267

SIX-ENGINE CRUISE PERFORMANCE

No External Tanks

			Optimum Cruise					Recommended Cruise				
W/δ × 10⁻⁶ lbs.	Alt. 1,000 ft.	Gross Weight lbs.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.
1.5	45	219,400	.780	449	2.53	8,510	.0392	.804	461	2.55	8,520	.0388
1.6	37	341,920	.780	449	2.66	8,750	.0256	.817	461	2.69	8,720	.0255
*1.7	40	314,840	.780	449	2.77	8,590	.0273	.798	461	2.80	8,430	.0268
*1.8	45	262,700	.780	449	2.86	8,390	.0319	.795	461	2.91	8,200	.0312

* Symmetrical and Asymmetrical Power Conditions Included

FIVE-ENGINE CRUISE PERFORMANCE

No External Tanks

			Optimum Cruise					Recommended Cruise				
W/δ - × 10⁻⁶ lbs.	Alt. 1,000 ft.	Gross Weight lbs.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.
.85	30	252,100	.640	377	2.29	7,090	.0280	.690	407	2.35	7,000	.0277
1.05	35	247,000	.670	386	2.44	7,910	.0319	.690	397	2.46	7,810	.0316
1.4	40	259,200	.733	421	2.80	8,280	.0319	.760	437	2.81	8,150	.0315

FOUR-ENGINE CRUISE PERFORMANCE

No External Tanks

			Optimum Cruise					Recommended Cruise				
W/δ x × 10⁻⁶ lbs.	Alt. 1,000 ft.	Gross Weight lbs.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.
* .55	20	252,670	.510	313	2.04	6,350	.0251	.545	335	2.11	6,250	.0248
** .55	20	242,275	.570	350	2.31	5,290	.0220	.605	371	2.37	5,240	.0218
* .85	30	252,000	.675	398	2.60	7,130	.0283	.705	415	2.66	7,050	.0280
** .85	30	252,280	.710	413	2.71	6,850	.0278	.730	430	2.67	6,770	.0274
*1.05	35	247,000	.665	383	2.73	7,680	.0311	.692	399	2.77	7,610	.0308
**1.05	35	247,000	.690	397	2.78	7,610	.0308	.710	409	2.82	7,540	.0305

* Symmetrical Power
** Asymmetrical Power

THREE-ENGINE CRUISE PERFORMANCE

No External Tanks

			Optimum Cruise					Recommended Cruise				
W/δ x × 10⁻⁶ lbs.	Alt. 1,000 ft.	Gross Weight lbs.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.	Mach No.	TAS kts.	EPR	Range Factor Wt x Mi / lb.	NAM / lb.
.4	17	208,080	.470	292	2.21	4,950	.0237	Unable to Attain Speed				
.6	25	222,500	.575	346	2.62	6,100	.0275	for Recommended Cruise				

b. (6) A range penalty table is presented below to summarize the per cent range loss for the various configurations discussed in the preceding Paragraphs b (1) through (5).

RANGE PENAL--

Eight Engines, No External Tanks Taken as 100%

Configuration	Number of Engines Operating	Average Per Cent Decrease in Range
Tanks	8	2.2
Clean	7	2.7
Clean	6	4.8
Oil Coolers 2.0 Inches Open	8	5.9
Both Tip Gear Extended	8	10.0
Bomb Bay Doors Open	8	7.9

c. (1) Power required data were obtained simultaneously with the range data during all the speed-power tests that were conducted. The data are presented in Figures 86 through 138 as plots of $N_2 \sqrt{\Theta_a}$ versus Mach No., N_{2std} versus V_c and exhaust gas pressure ratio versus Mach number. Summary plots of the exhaust gas pressure ratio (E.P.R.) required for any Mach number, altitude and weight combination are presented in Figures 97 and 98 for eight-engine operations with external tanks off and on. Though RPM may be used for cruise control, it is felt that whenever a mission is flown at a constant W/δ, the engine pressure ratio gages will be used, as one reading on all the gages is all that is necessary for a given W/δ and Mach number. Consequently, if this EPR is maintained and the cruise Mach number is held, the aircraft will seek the correct altitude for optimum W/δ and a complete range mission may be flown with one EPR setting. Another disadvantage is using RPM as a basic cruise control instrument is that no two J57-P-1 engines require the same RPM to deliver the same thrust. It will be noted that all RPM data are presented in terms of per cent RPM. This was because of the difference in RPM for the same power mentioned above. A value of 100% RPM for each engine was chosen as that RPM which would trim the engines to the installed static thrust rating without water injection at the end of a 5-minute run on a sea level standard day. All power required data are summarized in tabular form and are presented in the following tables.

8 ENGINES – NO EXTERNAL TANKS

W/δ × 10⁻⁶ Lbs.	Alt. 1000 Feet	Gross Weight Lbs.	Max. RPM %N_2	Max. EPR	Mach Number: Max. EPR	EPR 1.65	EPR 1.6	EPR 1.5	EPR 1.4	EPR 1.35	
* .4	15	225,700	–	–	–	.703	.666	.587	.484	.380	
					Mach Number: Max. EPR	**EPR 2.6**	**EPR 2.4**	**EPR 2.2**	**EPR 2.0**	**EPR 1.8**	**EPR 1.7**
.8	30	237,300	98.4	2.56	.892	.894	.885	.871	.844	.743	.644
					Mach Number: Max. EPR	**EPR 2.8**	**EPR 2.7**	**EPR 2.6**	**EPR 2.4**	**EPR 2.2**	**EPR 2.0**
1.2	35	282,300	97.6	3.00	.903	.898	.894	.888	.871	.844	.787
1.6	37	341,920	97.4	2.79	.882	.883	.874	.865	.840	.775	–
1.6	40	296,320	97.4	2.83	.884	.883	.874	.865	.840	.775	–
1.6	45	233,000	97.4	2.69	.874	.883	.874	.865	.840	.775	–
1.6	48	202,240	97.4	2.71	.876	.883	.874	.865	.840	.775	–
1.8	40	333,360	97.3	2.76	.865	.870	.858	.845	.805	–	–
1.8	45	262,700	97.4	2.84	.373	.870	.858	.845	.805	–	–
1.8	50	206,820	97 3	2.85	.874	.870	.858	.845	.805	–	–
					Mach Number: Max. EPR	**EPR 2.85**	**EPR 2.80**	**EPR 2.75**	**EPR 2.70**	**EPR 2.65**	**EPR 2.60**
2.0	45	291,900	97.2	2.75	.843	.856	.849	.841	.832	.815	.800
					Mach Number: Max. EPR	**EPR 2.88**	**EPR 2.84**	**EPR 2.80**	**EPR 2.76**		
2.2	52	229,680	96.95	2.85	.808	.811	.802	.795	.775		
2.2	55	199,080	96.8	2.81	.800	.811	.802	.795	.775		

* **Maximum Speed is over the maximum V_e allowable**

8 Engines – 2 – 1000-Gallon External Tanks

W/δ × 10⁻⁶ Lbs.	Alt. 1000 Feet	Gross Weight Lbs.	Max. RPM % N_2	Max. EPR	Mach Number: Max. EPR	EPR 2.8	EPR 2.7	EPR 2.6	EPR 2.5	EPR 2.4	EPR 2.3
1.6	37	341,920	97.4	2.85	.887	–	.875	.860	.852	.840	.819
1.6	40	296,320	97.5	2.90	.892	–	.875	.860	.852	.840	.819
1.7	37	363,290	97.4	2.77	.875	.878	.867	.855	.840	.823	.795
1.8	38.5	358,200	97.3	2.77	.862	.865	.856	.844	.829	.789	–
1.8	40	333,360	97.3	2.78	.863	.865	.856	.844	.829	.789	–
					Mach Number: Max. EPR	EPR 2.90	EPR 2.80	EPR 2.75	EPR 2.70	EPR 2.65	EPR 2.60
2.0	40	370,400	97.2	2.78	.844	.870	.850	.837	.825	.814	.797
2.0	45	291,600	97.2	2.82	.853	.870	.850	.837	.825	.814	.797

8 Engines – 2 Tip Gear Extended

					Mach Number: Max. EPR	EPR 2.9	EPR 2.8	EPR 2.7	EPR 2.6	EPR 2.5	EPR 2.4
1.8	40	333,360	97.3	2.76	.845	.867	.851	.832	.805	.761	–
*1.8	40	333,360	97.3	2.76	.865	.879	.870	.858	.845	.829	.805

* Clean – 8 Engines

8 Engines – Bomb Bay Doors Open

					Mach Number: Max. EPR	EPR 2.9	EPR 2.8	EPR 2.7	EPR 2.6	EPR 2.5	EPR 2.4
1.6	40	296,000	97.4	2.76	.870	.883	.875	.863	.852	.836	.814
*1.6	40	296,000	97.4	2.83	.884	–	.883	.874	.865	.854	.840
1.8	40	333,360	97.3	2.77	.850	.863	.853	.840	.824	.797	–
*1.8	40	333,360	97.3	2.76	.865	.878	.870	.858	.845	.829	.805

* Clean – 8 Engines

8 Engines – Oil Coolers Open, No Tanks

W/δ × 10⁻⁶ Lbs.	Alt. 1000 Feet	Gross Weight Lbs.	Max. RPM %N,	Max. EPR	Mach Number Max. EPR	EPR 2.70	EPR 2.60	EPR 2.50	EPR 2.45	EPP 2.40	EPR 2.35
*1.8	50	206,820	97.3	2.90	.866	.854	.836	.803	.771	–	–
**1.8	50	206,820	97.3	2.85	.874	.858	.845	.829	.818	.805	.781

* Oil Coolers Full Open (2.0 inches)
** Oil Coolers 0.2 inches open

7 Engines – No External Tanks

					Mach Number Max. EPR	EPR 2.80	EPR 2.70	EPR 2.60	EPR 2.55	EPR 2.50	EPR 2.45
1.6	37	341,920	97.3	3.00	.862	–	.846	.830	.818	.802	.775
1.7	40	314,800	97.2	2.76	.846	.850	.838	.815	.797	.770	–

					Mach Number Max. EPR	EPR 2.85	EPR 2.80	EPR 2.75	EPR 2.70	EPR 2.65	EPR 2.60
1.8	45	262,440	97.2	2.85	.846	.846	.843	.837	.827	.812	.789
1.9	42	319,770	97.0	2.76	.810	.825	.817	.807	.790	–	–

6 Engines – No External Tanks

					Mach Number Max. EPR	EPR 2.80	EPR 2.75	EPR 2.70	EPR 2.66	EPR 2.60	EPR 2.55
1.5	45	219,400	97.15	2.74	.850	–	–	.845	.837	.823	.799
1.6	37	341,920	97.1	2.83	.843	.837	.823	.806	.775	–	–

					Mach Number Max. EPR	EPR 3.00	EPR 2.95	EPR 2.90	EPR 2.85	EPR 2.80	EPR 2.75
1.7	40	314,840	97.15	2.80	.800	–	–	.833	.820	.800	.755
1.8	45	262,700	96.95	2.84	.770	.823	.814	.800	.775	–	–

5 Engines – No External Tanks

W/δ × 10^{-6} Lbs.	Alt. 1000 Feet	Gross Weight Lbs.	Max. RPM % N_2	Max. EPR	Mach Number Max. EPR	EPR 2.8	EPR 2.7	EPR 2.6	EPR 2.5	EPR 2.4	EPR 2.3
.85	30	252,100	98.1	2.57	.805	.864	.843	.815	.776	.723	.647
1.05	35	247,000	97.15	2.76	.816	.830	.797	.760	.717	–	–

					Mach Number Max. EPR	EPR 2.92	EPR 2.89	EPR 2.86	EPR 2.83	EPR 2.80	EPR
1.4	40	259,200	96.9	2.84	.780	.808	.800	.787	.772	.744	–

4 Engines – No External Tanks

					Mach Number Max. EPR	EPR 2.5	EPR 2.4	EPR 2.3	EPR 2.2	EPR 2.1	EPR 2.0
* .55	20	252,670	98.85	2.6	.730	.692	.658	.622	.583	.546	.482
** .55	20	242,275	98.9	2.6	.710	.668	.619	.564	.500	–	–

					Mach Number Max. EPR	EPR 2.80	EPR 2.70	EPR 2.68	EPR 2.66	EPR 2.65	EPR 2.35
* .85	30	252,000	97.6	2.74	.735	.748	.716	.709	.707	.702	.633
** .85	30	252,280	97.4	2.73	.715	–	.700	.689	.672	.657	–

					Mach Number Max. EPR	EPR 2.88	EPR 2.84	EPR 2.82	EPR 2.80	EPR 2.78	EPR 2.75
*1.05	35	247,000	96.6	2.81	.715	.728	.719	.714	.707	.698	.682
**1.05	35	247,000	96.4	2.79	.695	–	.715	.709	.700	.684	–

* Symmetrical Power

** Asymmetrical Power

3 Engines – No External Tanks

					Mach Number Max. EPR	EPR 2.40	EPR 2.35	EPR 2.30	EPR 2.25	EPR 2.20	EPR 2.10
.4	17	208,080	98.8	2.59	.595	.548	.525	.510	.487	.463	.412

					Mach Number Max. EPR	EPR 2.62	EPR 2.58	EPR 2.54	EPR 2.50
.6	25	222,500	97.7	2.65	.593	.575	.545	.510	.465

c. (2) Power required tests were conducted at low altitude in the gear and flaps extended, gear and speed brakes extended, flaps only extended, flaps 37% extended, gear and flaps and speed brakes 1/3 extended, and gear and flaps and speed brakes fully extended configurations. These data are presented in Figures 113 through 118 as plots of $N_2/\sqrt{\Theta_a}$ versus true airspeed and in Figures 133 through 138 as plots of N_{2std} versus CAS. A table of the power required for for operation in the configurations listed is presented below:

POWER REQUIRED
APPROACH CONFIGURATIONS

Eight Engines, No External Tanks

Configuration	$W/\delta x$ 10^{-6} lbs.	Altitude Ft.	Gross Weight Lbs.	Calibrated Airspeed					
Flaps Full Down	.4	15,000	225,680	90.8% RPM 190	90.4% RPM 183	90.0% RPM 176	89.6% RPM 168	89.2% RPM 159	88.8% RPM 148
	.6	15,000	338,000	92.6% RPM 190	92.4% RPM 187	92.2% RPM 184	92.0% RPM 178	91.8% RPM 162	
Flaps and Gear Down	.4	15,000	225,680	93.4% RPM 185	92.8% RPM 177	92.2% RPM 169	91.4% RPM 157	90.6% RPM 143	90.0% RPM 129
Flaps and Gear Down, Speed Brakes Full Up	.4	17,000	208,080	98% RPM 163	97% RPM 155	96% RPM 145	95% RPM 129		
Flaps and Gear Down, Speed Brakes Position 2	.4	13,000	244,480	95% RPM 183	94% RPM 173	93% RPM 163	92% RPM 150	91% RPM 135	
Flaps 37%	.4	15,000	225,700	98% RPM 235	96% RPM 214	94.9% RPM 191	92% RPM 165	91% RPM 148	
Gear and Full Speed Brakes	.4	10,000	275,000	98% RPM 221	97% RPM 210	96% RPM 199	95% RPM 185	94% RPM 167	

d. (1) Drag data were obtained on all level-flight speed power points. Thrust measurements were made by means of standard production tailpipe pressure probes located in the tailpipe (a diagram of this installation is presented on Page 21, Appendix II). The tailpipe probe calibration determined from the Universal Thrust Stand Tests conducted at Edwards Air Force Base agreed within approximately 2% of the published calibration made by Pratt & Whitney Aircraft Company. Since the contractor had conducted tests in an altitude chamber on the engines and found that the nozzle coefficients changed with altitude and the thrust stand calibration had closely agreed with the published values, it was decided to extrapolate the test tailpipe probe calibration based on the contractor's nozzle coefficients. All drag data are presented in Figures 139 through 183 and are summarized in the following table:

AIRCRAFT DRAG SUMMARY

Configuration	Engines Operating	Efficiency Factor (e)	C_{d_p} ($C_L = 0$)	Equivalent Flat Plate Area (f) (Ft^2)	C_L Range	M Range
Clean	8	.800	.01175	47.00	.45-.80	.6-.70
Tanks	8	.797	.01188	47.60	.45-.75	.6-.70
Both Tip Gear Dn.	8	.774	.01460	58.40	.50-.70	.65-.75
Bomb Doors Open	8	.754	.01340	53.60	.60-.75	.60-.77
Oil Coolers Full Open	8	.756	.01320	52.80	.40-.60	.65-.75
Clean	7	.793	.01200	48.10	.50-.75	.60-.70
Clean	6	.792	.01226	49.04	.4-.7	.60-.70
Clean	5	.790	.02158	50.03	.25-.65	.47-.80
Symmetrical Power	4	.787	.01273	51.00	.25-.70	.38-.65
*Assym. Power	4	.786	.01278	51.10	.20-.50	.55-.68
Clean	3	.785	.01300	52.20	.20-.65	.35-.55

*Data reflects average of three speed powers.

d. (2) Drag data were also obtained at low altitude in the gear, flaps and speed brakes extended, gear and flaps extended, gear and speed brakes extended, flaps only extended, flaps 37% extended, and the gear down, flaps down and speed brakes one-third extended configurations. The drag polars and thrust required are presented on Figures 161 through 166 and Figures 178 through 183, and are summarized on the following page:

AIRCRAFT DRAG SUMMARY

Approach Configurations
8 Engines Operating

Configuration	Efficiency Factor (e)	C_{d_p} ($C_L = 0$)	Equivalent Flat Plate Area (f) (Ft^2)	C_L Range
Flaps full down	.682	.041	164.0	.4-1.2
Flaps down 37%	.668	.053	212.0	.3-1.0
Flaps & Gear Down	.698	.062	248.0	.6-1.1
Flaps down, Gear down Speed Brakes Pos. No. 2 (1/3 up)	.748	.0740	296.0	.5-1.1
Flaps down, Gear down Speed brakes full up	.595	.108	432.0	.7-1.2
Gear down, Speed brakes full up	.714	.071	282.0	.5-.8

e. (1) All level-flight data were obtained by flying each successive speed-power point at an altitude selected to give a constant ratio of gross weight to atmospheric pressure (W/δ) in order to provide a minimum weight correction for the basic data. All weight-pressure ratios were preselected to cover the altitude-weight range over which the aircraft might ever possibly be flown. The methods of reduction are outlined in Reference No. 1 and the equations used are as follows:

$$N_{2_s} = N_{2_t} \sqrt{T_{a_s}/T_{a_t}} \quad + \quad \Delta N_2$$

Where

ΔN_2 = Weight correction obtained from the following relation:

$$\Delta N_2 = \left(\Delta C_L^2 \Big/ \frac{\Delta C_L^2}{\Delta C_D}\right) \left(\frac{M^2 S \delta_a}{.000675}\right) \left(\frac{1}{\delta t_2}\right) \left(\frac{\Delta N_2 \sqrt{T_a}}{\Delta F_n/\delta t_2}\right) \sqrt{T_a}$$

ΔC_L^2 = Computed difference between test C_L^2 and Standard C_L^2

ΔC_L^2 = Obtained from manufacturers' predicted data and put into the form of curves of $\Delta C_L^2/\Delta C_D$ versus Mach number.

$\frac{\Delta N_2 / \sqrt{T_a}}{\Delta F_n / \delta t_2}$ = Thrust correction obtained from engine manufacturer's engine specification and put into the form of curves of $(\Delta F_n/\delta t_2) \;/\; (\Delta N_2 / \sqrt{T_2})$ versus Mach number.

Fuel flow corrections for nonstandard weight conditions were obtained from the slopes of curves of test fuel flow data in the form of $N_2 / \sqrt{\theta_{t_2}}$ vs. $W_f/\delta t_2 \sqrt{\theta_{t_2}}$ presented in Figure 194 which were replotted to give curves of $\Delta W_f/\delta t_2 \sqrt{\theta_{t_2}} \;/ \Delta N_2 / \sqrt{\theta_{t_2}}$ versus $N_2 \sqrt{\theta_{t_2}}$.

From these c[illegible] the fuel flow correction was made as follows:

$$(\Delta N_2 / \sqrt{\theta_{t_2}}) \; (\Delta W_f / \delta t_2 \sqrt{\theta_{t_2}} \;/\; \Delta N_2 \sqrt{\theta_{t_2}}) = \Delta W_f/\delta t_2 \sqrt{\theta_{t_2}}$$

To determine maximum rated RPM in level flight for standard day condition, it was necessary to estimate from the plots of the corrected test data the maximum attainable Mach number under the desired conditions and then determine the standard day compressor inlet temperature which, in turn, determined the standard day maximum RPM by use of the RPM bias curve discussed under Paragraph 4-b and presented in Figure 207.

e. (2) Thrust required and drag data obtained during the tests were reduced through use of exhaust gas rake pressure probe calibrations obtained from static thrust runs conducted on the Edwards Air Force Base Universal Thrust Stand. The calibration data have been extrapolated to include all conditions of flight by use of the thrust coefficients for the exhaust nozzle presented by the engine manufacturer in the Pratt & Whitney gas turbine installations handbook, Curve No. INST 17146. No air flow data were obtained. The Pratt & Whitney recommended method for determination of air flow was utilized. The curve used for this determination is presented in Figure 202. To obtain net thrust of the engine installation the ram drag was subtracted from gross thrust as follows:

$$F_n = F_g - F_e.$$

$$F_e = 0524\, W_a\, V_t$$

e. (3) Lift and drag coefficients for incompressible flow were calculated from the following equations:

$$C_L = 295\, W_t / V_e^2 S$$

$$C_D = 295\, F_{n_t} / V_e^2 S$$

7. Range Missions

Three range missions were flown during the Phase IV flight tests. One, to simulate an actual bombing mission, was flown at a takeoff weight of 373,140 pounds in accordance with National Military Establishment rules as outlined in Mil-C-5011A at a constant weight-over pressure ratio of 1,700,000 pounds. The total air distance traveled on this mission was 5,150 miles and 22,816 pounds of fuel was on board at landing. The second mission was flown at a constant W/δ of 1,700,000 to 45,000 feet and then an altitude of 45,000 feet was held for the remainder of the mission. No bomb run, simulated bomb drop, or evasive action was made on this mission. The purpose was strictly to determine the maximum range of the aircraft at an engine start gross weight of 390,410 pounds and to verify Phase IV test data. The distance traveled on this mission was 6,060 miles and 14,178 pounds of fuel remained on board at landing. The third range flight flown was a simulated one-way lightweight high-altitude bombing mission where sufficient fuel was carried to climbout and cruise for 900 nautical miles, drop a bomb, and then fly for 200 miles prior to being out of fuel. Ten thousand pounds of fuel was carried to simulate the bomb load. All three missions were flown without external tanks installed. The range mission data verifies the Phase IV speed-power polar data and are presented as time histories on Figures 76 through 85. Also range mission data are spotted on the aircraft range capabilities plot on Figure 75 and on the optimum W/δ for maximum range plot on Figure 73.

8. Airspeed and Altimeter System

a. The standard production pilots' airspeed and altimeter system was used throughout all tests. The system consisted of a Kollsman round head pitot pickup located on the side of the fuselage 119.6 inches aft of the nose with static ports located 114.2 inches aft of the total pickup and also on the side of the body. A schematic diagram of the complete aircraft pitot-static system is presented on Page 22 of Appendix II. The system was calibrated in the clean, gear, gear and flaps, full flaps, 37 · flaps, gear and speed brakes and flap and speed brakes configurations. Under all conditions, the airspeed and altimeter system errors were small and considered not to be excessive. At cruise Mach number and W/δ, the position error correction is, for all practical purposes, zero. The calibrations in the clean configuration were obtained at 335,000, 400,000, 800,000, 1,200,000, 1,700,000, 1,800,000 and 1,880,000 pounds W/δ at altitudes ranging from 15,000 feet to 45,000 feet. All approach configuration calibrations were made at altitudes ranging from 8,000 to 15,000 feet and at approximately 230,000 pounds. All clean configuration calibrations were made using AFFTC-F-86E pacer Airplane No. 50-582. The results of the above-mentioned calibrations are presented as position error corrections to be added in Figures 189 through 191.

b. The airspeed system was calibrated in ground effect with wing flaps full down with the main gear in contact with the runway. These calibrations were obtained by comparing the actual true speed, corrected for wind and atmospheric conditions, as obtained from the Boeing Airplane Company's phototheodolite to the indicated speed on the airplane photorecorder for various speeds as the aircraft rolled down the runway. It was found that a reasonable calibration could be obtained when wind conditions were less than 5 knots. At winds greater than 5 knots the error in indicated airspeed varied from 0 to +15 knots. This is believed to be due to wind gust effects on the airspeed system and the differences in wind velocity from the point where the wind data is obtained from an anemometer and where the aircraft is located on the runway. A plot of IAS versus time from brake release for three takeoffs is presented in Figure 193 to show the effects of wind during ground roll. From this plot it can be seen that at times during the roll the indicated airspeed actually decreases 2 knots or more. This could be a very unsatisfactory condition if the pilot depended on the wind for takeoff since on all heavyweight takeoffs the pilots will, of necessity, have to use line speed checks as the takeoff progresses. A false reading of 3 or 4 knots may cause a pilot to abort a takeoff when it is not necessary or to continue when he should abort. For example, at Refusal speed on a standard day for a 405,000-pound takeoff, a 4-knot IAS error could cause approximately 900 feet increase in ground roll.

c. The altimeter corrections for position error were computed from the airspeed calibrations data by use of the following expression derived from Reference No. 1.

$$\frac{dh}{dv} = V_c \left[\frac{1 + \frac{V_c}{2,183,944}}{11,282} \right]^{2.5}$$

d. The variation of indicated free air temperature with airspeed was obtained from the airspeed calibration data. Test data indicate that 96% of full adiabatic temperature rise was obtained with the two Test C-10 type bulbs located on the under side of the fuselage 121.6 inches aft of the nose of the aircraft. The ship's standard temperature indicating system reflects approximately 85% full adiabatic temperature rise between .75 and .85 Mach number. The test data scatter range between 80% and 90% adiabatic rise.

9. Descents

a. Descent performance data were obtained at 225,000 and 320,000 pounds gross weight at speeds for normal and maximum performance both with the gear extended and retracted. One maximum performance descent was made at 225,000 pounds with 4 engines cut off. Though the descent performance of the test aircraft is considered excellent, the maximum rate of descent

was approximately 23% less than predicted, being 14,500 feet per minute at 225,000 pounds with speed brakes extended, gear extended, 4 engines idle and 4 engines shut down while predicted descent performance for the same conditions is 19,000 feet per minute. Descents at speeds above 305 knots are not considered practicable due to very uncomfortable rolling and yawing oscillations which are caused by unsymmetrical blow-down of the spoilers at high "q". Unless there is a definite emergency where a rapid letdown is imperative, it is felt that the best descent procedure is to hold .75 Mach number until 260 to 280 knots IAS is reached and then hold constant IAS to as low an altitude as is desired.

DESCENT PERFORMANCE

8 Engines Idle
Gear and Air Brakes Extended
225,000 Pounds Average Gross Weight

Altitude feet	R/D 1,000 Ft/Min	T/D (Min.)	Mach No.	V_c (Knots)	Naut. Miles Traveled	Fuel Used (Pounds)
S.L.	8.7	0	.445	300	0	0
10,000	10.6	1.1	.545	300	6	100
20,000	12.4	1.9	.660	300	10	180
30,000	12.8	2.7	.784	300	13	250
40,000	10.8	3.4	.800	247	16	330
50,000	4.5	5.1	.800	192	23	440

8 Engines Idle

Gear and Air Brakes Extended
225,000 Pounds Average Gross Weight
Normal Time Descent

S.L.	5.8	0	.392	268	0	0
10,000	7.7	1.5	.485	268	7	160
20,000	9.3	2.65	.591	269	12	260
30,000	10.2	3.68	.724	270	17	340
40,000	8.6	4.74	.756	227	20	440
50,000	2.7	6.70	.770	179	28	590

Four Engines Idle, Four Engines Cut Off

Gear & Air Brakes Extended
225,000 Pounds Average Gross Weight
Minimum Time Descent

Altitude feet	R/D Ft/Min	T/D (Min.)	Mach No.	V_c (Knots)	Naut. Miles Traveled	Fuel Used (Pounds)
S.L.	10,000	0	.455	300	0	0
10,000	11,600	1.08	.542	300	5	80
20,000	13,000	1.85	.650	300	9	127
30,000	14,200	2.50	.765	288	12	158
40,000	12,900	3.12	.770	234	16	179
50,000	6,900	4.23	.770	183	20	200

Eight Engines Idle

Gear Retracted Air Brakes Extended
225,000 Pounds Average Gross Weight

Altitude feet	R/D Ft/Min	T/D (Min.)	Mach No.	V_c (Knots)	Naut. Miles Traveled	Fuel Used (Pounds)
S.L.	5,000	0	.526	350	0	0
10,000	8,100	1.5	.630	350	8	160
20,000	11,000	2.61	.766	350	15	220
30,000	11,400	3.41	.800	308	20	290
40,000	7,800	4.40	.800	248	25	370
50,000	4,200	6.25	.800	196	32	500

Eight Engines Idle

Gear & Air Brakes Extended
320,000 Pounds Average Gross Weight

Altitude feet	R/D Ft/Min	T/D (Min.)	Mach No.	V_c (Knots)	Naut. Miles Traveled	Fuel Used (Pounds)
S.L.	4,700	0	.452	300	0	0
10,000	6,500	1.81	.548	300	9	180
20,000	8,200	3.05	.646	300	16	290
30,000	9,900	4.12	.740	283	20	370
40,000	6,100	5.45	.800	225	25	460

Eight Engines Idle

Gear Retracted Air Brakes Extended
320,000 Pounds Average Gross Weight

Altitude feet	R/D 1000 Ft/Min	T/D (Min.)	Mach No.	V_c (Knots)	Naut. Miles Traveled	Fuel Used (Pounds)
S.L.	2.6	0	.529	353	0	0
10,000	4.4	3.0	.638	351	18	280
20,000	6.4	4.8	.760	350	27	430
30,000	8.5	6.11	.800	306	35	550
40,000	6.5	7.4	.800	243	41	660
45,000	5.0	8.35	.800	214	44	710

b. The engines were at idle during all descents and no thrust corrections were made to the data. This is because the effects of non-standard day temperature on thrust are very small relative to the high rates of descents encountered, and can be neglected. All descents were corrected to NACA standard atmospheric conditions to either 225,000 or 320,000 pounds gross weight by use of the following relationships derived in Reference No. 1:

$$R/D = dh/dt = \sqrt{T_a/T_{a_s}}$$

Weight corrections were applied to the data by the following equations also derived in Reference No. 1.

$$\Delta R/D_1 = R/D \times \Delta W/W_t$$

$$\Delta R/D_2 = 50.65 \frac{T_{a_s} \Delta W}{P_a M b^2 e}$$

Where $\Delta W = W_s - W_t$

10. Landings

a. Normal and performance landings to determine the minimum runway distance required to land over a 50-foot obstacle were conducted at gross weights varying from 182,700 to 327,250 pounds. Approaches were made using various combinations of speed brakes from Position 0 (full down) to Position 6 (full up). The pilot determined that the best combination on approach for speed bleed off, best approach angle, and satisfactory lateral control occurs when the spoilers are set at Position 2 (33.3% up on all spoilers on both wings) and the airspeed is held approximately 10 knots higher than on a no-spoilers approach. Full-up spoilers on both wings were used shortly after touchdown (see Pages 10, 30 and 31, Appendix 11 for diagrams and photographs

of the spoiler system). Landings were made with wheel brakes only, wheel brakes and air brakes, wheel brakes and drag chute and air brakes, and air brakes and drag chute only. One flaps-up landing was made with wheel brakes, air brakes and drag chute. The results of the landing tests indicate considerable scatter in the data. The landings show that the contractor's estimated distance from 50 feet to touchdown of 800 feet with the spoilers on Position 2 is optimistic by a factor of approximately 100%. By taking an average of the 12 shortest distances obtained from 50 feet to touchdown at various weights ranging from 183,000 to 327,000 pounds, the test landings indicate that 1,575 feet are required with spoilers at Position 2 on approach. It should be noted, however, that the predicted value of 800 feet is based on all engines operating at idle from 50 feet to touchdown. This is considered somewhat impractical in B-52 type aircraft as it is necessary to use some power at times to hit the end of the runway as would be done on an actual maximum performance short field landing. On the maximum performance landings with chute, speed brakes and wheel brakes, the distances varied from within 150 feet of agreement with predicted values in one case to 50% longer than the predicted value with the average being 25% greater than predicted for a weight range of 184,000 to 327,000 pounds. This scatter is attributable to the IAS at touchdown being an average of 4.5 knots faster than the speed for which the predicted distances were based. The aircraft can be landed at the estimated minimum speeds for touchdown with the spoilers at Position 2, but a nose-high attitude is incurred in which extremely hard landings result. A more practical airspeed of 5 knots IAS over the minimum speed for touchdown was used for the aim touchdown speed. However, in all the other landing configurations the estimated ground roll distances were bettered in three cases and never exceeded by more than 12%. At all conditions tested it is felt that the landing performance, at weights up to 327,000 pounds, is satisfactory. All landings were corrected to sea level, standard day, no wind conditions and the results are presented at test weight in the following table.

MAXIMUM PERFORMANCE LANDINGS

Wheel Brakes, Air Brakes & Drag Chute

Gross Weight (Pounds)	Runway Cond.	Spoilers on Approach	IAS 50 Ft. (Knots)	IAS T.D. (Knots)	Dist. from 50 Ft. to T.D. (Feet)	Ground Roll (Feet)	Total Dist. 50 Ft. to Stop (Feet)
265,000	Wet	2	132.0	123.5	1,640	3,960	5,000
223,500	Dry	2	127.0	114.5	2,670	3,190	5,860
(1) 184,000	Dry	2	115.5	99.0	1,560	2,690	4,250
214,000	Wet	0	120.5	111.5	1,560	2,690	4,250
201,000	Dry	2	107.5	103.5	1,480	2,550	4,030
(2) 284,500	Dry	2	134.5	121.5	1,750	5,760	7,510
320,000	Dry	2	149.0	137.5	2,680	5,200	7,880
327,000	Dry	2	145.0	134.0	1,575	5,075	6,650
(3) 221,500*	Dry	2	161.0	157.5	1,710	5,100	6,010

* Wind greater than 10 knots
(1) Spoilers left on Position 2 (1/3 up) during landing roll
(2) 6 degrees cross-wind trim on all gear
(3) Flaps retracted

Wheel Brakes & Air Brakes

	Gross Weight (Pounds)	Runway Cond.	Spoilers on Approach	IAS 50 Ft. (Knots)	IAS T.D. (Knots)	Dist. from 50 Ft. to T.D. (Feet)	Ground Roll (Feet)	Total Dist. 50 Ft. to Stop (Feet)
	210,000	Wet	2	120.0	103.0	1,300	2,220	3,520
	303,500*	Dry	2	115.0	105.0	1,920	2,570	4,490
(1)	249,500	Wet	2	121.0	109.5	1,490	3,410	4,900
	201,000	Wet	6	---	---	1,040	3,110	4,150
	Wheel Brakes Only							
	183,000	Dry	0	107.0	97.0	1,420	4,130	5,550
	196,000	Dry	0	108.0	101.5	1,520	3,810	5,330
	Air Brakes & Drag Chute (No Wheel Brakes) 6 Engines Shut Off At Touch-Down							
	192,000	Dry	2	118.0	107.0	1,960	8,420	10,380

* Wind greater than 10 knots
(1) Spoilers left on Position 2 (1/3 up) during landing roll

b. The relationships used to correct the landing data to standard day no-wind conditions are derived in Reference 1 and are as follows:

$$S_{t_s} = S_{a_s} + S_{g_s}$$

$$S_{a_s} = S_{a_t} + V_w \times t$$

$$S_{g_s} = S_{g_t} \left(\frac{(V_{t_d} + V_w)}{(V_{t_d})}\right)^{1.85} \times \sigma$$

11. Engine Thrust Calibration

a. The eight engines used during the test program were operated on the AFFTC Universal Thrust Stand in order to calibrate the exhaust gas pressure probes and to determine the installed static performance of the J57-P-1 engine under both normal conditions and 8,600 pounds per hour water injection. The specific fuel consumption of the engines as determined from the thrust runs checks very closely with that predicted by Pratt & Whitney for normal and maximum power operation without water injection.

The predicted values are .775 and .795 pounds of fuel per pound of thrust per hour for normal and maximum power, respectively. The test values are .780 and .790 pounds of fuel per pound of thrust per hour which agree within .6% of the predicted values listed above. When water injection was used a specific fuel consumption of .850 was obtained at takeoff rated power which agrees with the predicted values. The data are presented in Figures 194 through 201 and are summarized in the following table:

STATIC ENGINE PERFORMANCE

No Water Injection

N_2 RPM	N_1 RPM	Gross Thrust Lbs.	Exhaust Gas Temp. °C.	Specific Fuel Consumption Lbs/Hr-Lb	Surge Bleed Valve Position
*9435	6030	9,250	572	.790	Closed
9200	5740	7,860	506	.780	Closed
8900	5365	6,135	444	.780	Closed
8600	4905	4,225	393	.878	One valve open
8200	4255	2,695	324	.938	Open
7900	3830	2,030	286	.981	Open
7600	3465	1,585	261	1.045	Open
7200	3070	1,190	230	1.158	Open
6800	2760	905	215	1.303	Open

* Rated Installed Thrust after Five Minutes Operation

STATIC ENGINE PERFORMANCE

8,600 Pounds Per Hour Water Injection

N_2 RPM	N_1 RPM	Gross Thrust Lbs.	Exhaust Gas Temp. °C.	Specific Fuel Consumption Lbs/Hr-Lb	Surge Bleed Valve Position
*9335	6315	10,270	544	.850	Closed
9250	6200	9,785	521	.840	Closed
9200	6140	9,550	505	.835	Closed
9150	6075	9,295	498	.830	Closed
9100	6025	9,040	486	.330	Closed

* Rated Installed Thrust after Five Minutes Operation

b. It will be noted from the above tables that 100% thrust dry is only 9,250 pounds as compared to the engine rating 10,000 pounds. This difference is attributable to the duct loss incurred under static conditions when the engine is installed. A 5% duct loss was used to compute the 100% installed rating. The value of 5% was determined from duct survey tests conducted by the Boeing Airplane Company on a complete engine installation under both ground operation

and in-flight conditions on the XB-52 USAF No. 49-230. The results of this test are contained in Boeing Report No. D12491-634, Page 15. The 5% duct loss for static operation has been recently revised to 3.4% loss based on recent test cell duct surveys.

B. DISCUSSION OF TEST RESULTS – STABILITY AND CONTROL

1. Test Configurations

a. The configurations listed in the following table were used throughout the test program.

Configuration	N_2 RPM	Trim Airspeed	Landing Gear	Wing Flaps
Takeoff	Maximum	--	Down	100%
Power	Maximum	Level Flight	Up	Up
Cruise	Level Flight	Max. Range	Up	Up
Glide	Idle	1.2 V_{s_g}	Up	Up
Power Approach	Level Flight	1.2 V_{s_1}	Down	100%
Landing	Idle	1.4 V_{s_1}	Down	100%

b. Center of gravity limits, as published in the Flight Handbook, were adhered to for all tests and were controlled by use and transfer of fuel.

2. Mechanical Characteristics of the Control Systems

a. All primary surface controls with the exception of the spoilers are tab-operated and free floating during most of their travel. In addition to the relatively small and ineffective ailerons, lateral control is augmented by seven hydraulically operated, fully modulated spoilers on each wing. A detailed description and diagrammatical presentation of these systems is presented on Pages 8 through 13 of Appendix II.

b. Lateral trim is accomplished by an electrically operated tab on each aileron which receives its signal from left or right movement of a thumb-actuated button on the outboard horn of each wheel.

c. The horizontal stabilizer is hydraulically operated and is the means of longitudinal trim. This mechanism receives its signal from a forward and aft motion of the same button as the aileron trim actuators. Manual operation is also possible by means of a hand crank. A diagram of this system is presented on Page 12 of Appendix II.

d. For directional trim, the rudder control tab is moved by a manual knob which is linked directly to the rudder control tab system. Directional damping is accomplished by means of of a magnetic bob weight yaw damper which is connected to a stability tab on the rudder.

e. To prevent excessive control deflection and resultant overcontrolling of the airplane at high impact pressures, a "Q" bellows is incorporated in the elevator and rudder control systems. This "Q" device senses total pressure and increases the control forces proportional to an increase in indicated airspeed.

3. Control Friction

a. Control friction tests were accomplished under zero airspeed conditions by moving the cockpit controls in a step type motion, recording the force required to initiate control tab movement. Under these conditions, the break-out forces were considered satisfactory. To simulate control forces under in-flight conditions, the Q-spring was pressurized with a hand-regulated air bottle. However, considerable difficulty was encountered in maintaining a constant pressure when the controls were operated. These data are presented in Figures 209 through 215 in Appendix IA and summarized in the following tables:

CONTROL FRICTION

Ground Test Data
28° C. Air Temperature

Control	Force Initially Required to Displace Control Tab-Pounds	Allowable Limit Mil-F-8785
Elevator	6.5	7
Rudder	0	14
Aileron	5	6

b. In-flight control friction tests were conducted at various airspeeds by slowly moving the cockpit controls until a deflection of the control surface was obtained. The force required to initiate control surface movement was then measured. In all cases the rudder and elevator breakout forces in flight were lower than specified in MIL-F-8785, however, the aileron breakout forces were an average of 4 pounds greater than specified. These data appear as test points on the plots of ground control friction as presented in Figures 209 through 215 of Appendix IA. They are summarized in the following table:

CONTROL FRICTION

In-Flight Data

Control	Force Initially Required to Displace Control Surface-Pounds	Allowable Limit Mil-F-8785
Elevator	5	7
Rudder	15	14
Aileron	10	6

4. Elevator Control Effectiveness during Takeoffs

a. Takeoff tests with wing flaps full down were conducted to determine if at the recommended trim setting, the elevator was effective in placing the airplane in a takeoff attitude. The center of gravity was varied from the most forward allowable critical loading, to the most aft. The data, presented in Figures 216 through 220 of Appendix IA and summarized in the following table show that elevator control was satisfactory for all weights and center of gravity positions. The pull force at the point of front gear lift-off was always less that 50 pounds. During the acceleration to 1.3 V_{sTO} excessive trim changes necessitated nose-down trim immediately after airplane lift-off. Since the airplane employs a thumb-actuated electrical button for longitudinal trim, this technique was not considered objectionable by the pilot. The maximum push forces were encountered at $1.1V_{sL}$ and were always less than 20 pounds.

ELEVATOR EFFECTIVENESS FOR TAKEOFF

Gross Weight (Pounds)	Center of Gravity (% MAC)	IAS for Takeoff Attitude (Knots)	Wheel Force at Takeoff Attitude (Pounds)	Stabilizer [illegible]m S[illegible]ings (Degrees)	N.U. Elevator Deflection at Takeoff Attitude (Degrees)	Push Wheel Force at 1.1 V_{t_o} (Pounds)
				Wing [illegible]ps Full Down		
378,000	22.15	149.5	45	3.3 N.U.	18.8	17
378,000	25.68	146.5	45	2.2 N.U.	18.8	15
363,000	32.28	143	35	0.2 N.U.	18.8	13
			Ext. Tanks Inst. Wing Flaps Full Down			
404,000	26.69	149.5	42	1.5 N.U.	20.1	17

5. Elevator Control Effectiveness during Landing

a. Landing tests were conducted from a minimum gross weight of 183,000 pounds to a maximum gross weight of 327,500 pounds and the center of gravity was varied throughout the allowable range. The data from these tests presented in Figures 221 through 226 in Appendix IA show that for a trim speed of approximately $1.2V_{sL}$ the elevator force required to reach airplane touchdown speed, was in all cases, lower than 50 pounds. One flaps-up landing was accomplished and required a pull force of 45 pounds at touchdown. The pilot considered the No. 2 position on the air brakes to give the most desirable approach attitude. The results of these tests are summarized as follows:

ELEVATOR EFFECTIVENESS FOR LANDING

Center of Gravity (% MAC)	Gross Weight (Pounds)	Trim Stabilizer Position (Degrees)	Trim Spoiler Position	IAS at Touchdown (Knots)	N.U. Elevator Deflection at Touchdown (Degrees)	Pull Wheel Force at Touchdown (Pounds)
21.7	214,500	4.0 N.U.	0	111.5	-0.3	5
26.1	212,600	0.9 N.D.	#2	111	15.5	30
26.6	203,300	0.2 N.D.	#2	105.5	8.0	10
28.4	224,500	0.0	#2	115	-2.5	0
*29.4	327,500	0.2 N.D.	#2	134.5	17.5	45
@*23.3	221,000	3.3 N.U.	0	158	-3.0	0

* External Tanks Installed
@ Flaps Up

6. Stalls

a. Forward and aft center of gravity stall tests were conducted at altitudes varying from 10,000 feet to 20,000 feet and gross weights varying from 220,000 pounds to 280,000 pounds. Four power-on and one power-off stalls were conducted at 48,000 feet at 240,000 pounds. To minimize dynamic lift effects, the rate of airspeed bleed off during the approach and stall was in the order of 1 knot per second.

b. The stall characteristics at low altitudes in straight flight with gear and flaps up and no external tanks installed were considered to be satisfactory. Airplane stall warning in the form of light buffet occurred at approximately 1.08 $V_{s_{cr}}$. In all cases there was a tendency for the right wing to drop. This was controllable by use of from one-half to full left aileron and left rudder. Stall recovery was initiated at the onset of the right wing heavy tendency and exhibited no uncontrollable or undesirable tendencies. Stall characteristics in straight flight with external tanks installed were considered excellent. Initial buffet would occur from 15 knots to 20 knots before the airplane reached heavy buffet. Generally, there were no wing-drop tendencies. Stall recovery in all cases with external tanks installed was initiated before a full stall because of very heavy airplane buffeting and vertical bounce in the magnitude of ±0.5g to 1g. Stall recovery was normal and did not result in an excessive pitch attitude or excessive airspeed. Stalls in the cruise configuration were not adversely affected by aft center-of-gravity positions except that more forward stick was required in the recovery. The data for these tests are presented in the form of time histories in Figure 236 and Figures 246 through 251 in Appendix IA and are summarized in the following tables:

STALL CHARACTERISTICS

External Tanks	Config.	Flap Position	Gear Position	G. W. (Pounds)	C. G. (% MAC)	Altitude (Feet)	Indicated Airspeeds (Knots)		Normal Accel.
Off	Cruise	Up	Up	232,000	19.1	19,500	Initial Buffet	-130	1.0
							Moderate Buffet	-128.5	
							Heavy Buffet		
Installed	Cruise	Up	Up	267,300	20.9	20,400	Initial Buffet	-149	1.0
							Moderate Buffet	-139	
							Heavy Buffet	-136	
							Minimum IAS	-126	
Installed	Cruise	Up	Up	282,000	31.1	19,800	Initial Buffet	-145	1.0
							Moderate Buffet	-144	
							Heavy Buffet	-142	
							Very Heavy Buff.	-133	
							Minimum IAS	-131.5	
Installed	Cruise	Up	Up	282,000	31.1	19,800	Initial Buffet	-144	1.0
							Moderate Buffet	-138.5	
							Heavy Buffet	-135.5	
							Minimum IAS	-111	
Installed	Cruise	Up	Up	279,000	31.6	20,300	Initial Buffet	-147.5	1.0
							Moderate Buffet	-143.5	
							Heavy Buffet	-138.5	
							Very Heavy Buff.	-129	
							Minimum IAS	-128.5	

C. Stalls in straight flight at 48,000 feet with gear and flaps up and no external tanks installed were accomplished with full, normal rated, and idle power settings. Stall warning occured at approximately 14 knots before heavy buffeting of the airplane. With power on, violent engine surge and resulting flame-out of at least two engines during each test severly restricted a full airplane stall at this altitude. The data for these tests are presented in the form of time histories in Figures 252, 255 and 256 in Appendix IA and are summarized in the following tables:

STALL CHARACTERISTICS

External Tanks	Config.	Flap Position	Gear Position	G. W. (Pounds)	C. G. (% MAC)	Altitude (Feet)	Indicated Airspeed (Knots)		Normal Accel.
Off	Cruise	Up	Up	252,500	19.1	47,700	Initial Buffet	-163.5	1.0
							Moderate Buffet	-149.5	
Off	Power	Up	Up	238,500	34.2	46,300	Initial Buffet	-153	1.0
							Moderate Buffet	-139	
Off	Glide	Up	Up	224,500	33.7	49,500	Initial Buffet	-145	1.0
							Moderate Buffet	-132	
							Heavy Buffet	-130	
							Minimum IAS	-129	

d. Stalls in straight flight with gear and flaps extended and no external tanks installed were unsatisfactory. There was virtually no stall warning. The normal acceleration time histories during these stalls with power on, as can be seen in Figures 227 through 235 in Appendix IA, indicate that there was approximately 1 to 2 knots initial buffet warning. However, this was so masked by buffeting of the wing flaps due to engine blast that airplane stall warning was not discernible by the pilot. In the landing configuration with the power off, stall warning occurred at from 1 to 2 knots before the airplane stalled. A right wing drop occurred simultaneously with initial buffet and could be stopped by full application of left aileron and left rudder, but the wing could not be raised until the stall was broken. There was a pitch-up tendency which occurred at the same time as the right wing drop and was aggravated by aft center-of-gravity position. This pitch-up could be controlled ' approximately three-quarters to full forward wheel movement. Recovery from the stall did not result in excessive airspeed buildup or excessive nose-down attitude. These data are summarized as follows:

STALL CHARACTERISTICS

External Tanks	Config.	Flap Position	Gear Position	G. W. (Pounds)	C. G. (% MAC)	Alt. (Feet)	Indicated Airspeeds (Knots)		Normal Accel.
Off	Pr. Appr.	100%	Down	234,500	19.5	12,700	Initial Buffet	-106	1.0
							Right Roll	-103.5	
							Moderate Buffet	-100	
							Minimum IAS	--96.5	
Off	Pr. Appr.	100%	Down	238,300	19.4	13,800	Initial Buffet	-106	1.0
							Right Roll	-105	
							Moderate Buffet	-105	
							Minimum IAS	-105	
Off	Pr. Appr.	100%	Down	220,000	31.2	13,900	Initial Buffet	-96	1.0
							Right Roll	-94	
							Minimum IAS	-90	
Off	Pr. Appr.	100%	Down	220,000	31.2	13,900	Initial Buffet	-97	1.0
							Right Roll	-96	
							Minimum IAS	-93	
Off	Pr. Appr.	100%	Down	220,000	31.2	13,900	Initial Buffet	-96.5	1.0
							Right Roll	-95	
							Minimum IAS	-89	
Off	Landing	100%	Down	236,800	19.4	14,900	Initial Buffet	-104.5	1.0
							Right Roll	-99.5	
							Moderate Buffet	-99.5	
							Minimum IAS	-92	
Off	Landing	100%	Down	236,800	19.4	14,900	Initial Buffet	-107.5	1.0
							Right Roll	-105.5	
							Moderate Buffet	-105.5	
							Heavy Buffet	-100.5	
							Minimum IAS	-96.5	
Off	Landing	100%	Down	218,000	30.6	13,300	Initial Buffet	-98	1.0
							Right Roll	-97	
							Minimum IAS	-94.5	
Off	Landing	100%	Down	218,000	30.6	13,300	Initial Buffet	-96.5	1.0
							Right Roll	-96.5	
							Left Roll	-95	
							Minimum IAS	-95	

e. Stalls in straight flight with gear and flaps extended and external tanks installed were considered satisfactory. There was an average of 10 knots stall warning and the rolling tendency at full stall was greatly reduced. A pitch-up tendency at full stall was aggravated by the aft center-of-gravity positions, but could easily be controlled. These data are presented in Figures 237 through 245 in Appendix IA and are summarized as follows:

STALL CHARACTERISTICS

External Tanks	Config.	Flap Position	Gear Position	G.W. (Pounds)	C.G. (% MAC)	Altitude (Feet)	Indicated Airspeeds (Knots)		Normal Accel.
Installed	Pr. Appr.	100%	Down	241,800	19.6	20,000	Initial Buffet	-107.5	1.0
							Moderate Buffet	-106.5	
							Heavy Buffet	-104	
							Minimum IAS	-94	
Installed	Pr. Appr.	100%	Down	239,500	34.5	18,800	Initial Buffet	-108.5	1.0
							Left Roll	-103	
							Moderate Buffet	-103	
							Heavy Buffet	-100	
							Minimum IAS	-90	
Installed	Pr. Appr.	100%	Down	239,500	34.5	18,800	Initial Buffet	-105.5	1.0
							Moderate Buffet	-103	
							Heavy Buffet	-94.5	
							Minimum IAS	-85.5	
Installed	Pr. Appr.	100%	Down	239,500	34.5	18,800	Initial Buffet	-105.5	1.0
							Moderate Buffet	-103	
							Heavy Buffet	-90.5	
							Minimum IAS	-78.5	
Installed	Pr. Appr.	100%	Down	239,500	34.5	18,800	Initial Buffet	-106	1.0
							Moderate Buffet	-103	
							Heavy Buffet	-102	
							Left Roll	-97.5	
							Minimum IAS	-84	
Installed	Pr. Appr.	100%	Down	240,000	20.1	14,000	Initial Buffet	-137	1.0
							Moderate Buffet	-135	
							Heavy Buffet	-132	
							Very Heavy Buff.	-115	
							Minimum IAS	-110.5	
Installed	Landing	100%	Down	241,000	19.8	17,000	Initial Buffet	-113	1.0
							Moderate Buffet	-111	
							Heavy Buffet	-108.5	
							Right Roll	-98	
							Minimum IAS	-89	
Installed	Landing	100%	Down	243,500	34.6	19,500	Initial Buffet	-111	1.0
							Moderate Buffet	-109.5	
							Heavy Buffet	-104.5	
							Minimum IAS	-89.5	

STALL CHARACTERISTICS

External Tanks	Config.	Flap Posi-tion	Gear Posi-tion	G. W. (Pounds)	C. G. (% MAC)	Alti-tude (Feet)	Indicated Airspeeds (Knots)		Normal Accel.
Installed	Landing	100%	Down	243,500	34.6	19,500	Initial Buffet	-111	1.0
							Moderate Buffet	-108	
							Heavy Buffet	-100.5	
							Minimum IAS	-73	

f. Accelerated stalls with gear and wing flaps up and no external tanks installed were accomplished at an altitude of 48,000 feet and at a gross weight of 239,000 pounds and 252,500 pounds. Airplane stall warning was good and the handling characteristics were satisfactory throughout the stall and recovery. The biggest limiting factor in stalls at this altitude is the certainty of engine surge and flame-out. Accelerated stalls at approximately 25,000 feet and 263,000 pounds were attempted. The airplane could not be fully stalled at 1.5 "g" normal acceleration because a dangerous nose-high, wing-down attitude was reached. A full stall under these conditions was considered unsafe by the pilot. The data from these tests are presented in the form of time histories in Figures 247, 250, 253, and 254 in Appendix IA and summarized in the following tables:

STALL CHARACTERISTICS

External Tanks	Config.	Flap Posi-tion	Gear Posi-tion	G. W. (Pounds)	C.G. (% MAC)	Alti-tude (Feet)	Indicated Airspeeds (Knots)		Normal Accel.
Installed	Cruise	Up	Up	262,800	19.6	25,000	Initial Buffet	-185	1.40
				Stall was not completed because of dangerous attitude of aircraft.					
Installed	Cruise	Up	Up	282,000	31.1	19,800	Initial Buffet	-187	1.25
							Moderate Buffet	-168.5	
							Minimum IAS	-159.5	
Off	Cruise	Up	Up	252,500	19.1	47,700	Initial Buffet	-201.5	1.40
							Moderate Buffet	-196	
Off	Cruise	Up	Up	239,000	34.1	47,200	Initial Buffet	-187	1.55
							Moderate Buffet	-186.5	
							Heavy Buffet	-185.5	
							Minimum IAS	-176	

7. Maneuvering Flight Characteristics

a. The maneuvering characteristics of the airplane with wing flaps and gear down were satisfactory. The force required for stabilized flight increased linearly with an increase in normal acceleration and fell within the limits outlined in MIL-F-8785. The stick-free maneuvering points were considerably greater than the aft center-of-gravity limits.

b. Maneuvering flight tests at 30,000 feet and 245,000 pounds with gear and wing flaps up were marginally satisfactory. Stick force variation with an increase in normal acceleration started with a gradient of 120 pounds per "g" at 1.1g's and gradually lightened with an increase in normal acceleration, as can be seen in Figures 263 and 264 of Appendix IA. All force gradients in the forward center-of-gravity configuration were an average of 14% higher than specified in MIL-F-8785. The same nonlinear variation of stick force with increased normal acceleration was exhibited at the aft center-of-gravity location; however, the forces fell within the specification.

c. All maneuvering flight tests at 48,000 feet with gear and wing flaps up, with and without external tanks, exhibited linear force variation and fell within the limits of MIL-F-8785 for all centers of gravity tested; however, by reference to Figure 267 in Appendix IA it can be seen that elevator control break-out forces are in the same magnitude as the force required for 1.15g. This is an undesirable situation since there is an overshoot tendency which makes it difficult to stabilize in a range of normal accelerations from 1.05g to 1.15g. All maneuvering data were obtained in steady turns at stabilized conditions of normal accelerations, wheel force, and airspeed. Altitude was varied to maintain airspeed. The data for all maneuvering flight tests are presented in Figures 257 through 272 in Appendix IA and are summarized as follows:

MANEUVERING FLIGHT CHARACTERISTICS

Configuration Altitude Weight Trim CAS	Max. Force Gradient C.G. % MAC	Max. Force Gradient Lbs/"g"	Min. Force Gradient C.G. % MAC	Min. Force Gradient Lbs./"g"	Normal Accel. for Force Gradient "g"	MIL-F-8785 Max. Force Gradient Pounds/"g"	MIL-F-8785 Min. Force Gradient Pounds/"g"	Stick-Free Maneuver Point % MAC	Design C.G. Limits % MAC
Power App. 10,000 Ft. 235,000 Lbs. 130 Knots	18	97	35	61	1.0-1.6	120	45	63.6	18-35
Cruise	18	120	35	42	1.1	77	29	44	18-35
30,000 Ft.	18	94	35	41	1.2			47	
245,000 Lbs.	18	90	35	40	1.4			75	
326 Knots	18	85	35	38	1.8			--	
	18	85	35	34	2.2			--	
Power 48,000 Ft. 260,000 Lbs. 201 Knots	18	67.5	35	36.5	1.0-1.5	79	29	47.5	18-35
Power	18	76	35	28	1.1	79	29	43	18-35
Ext. Tanks	18	67	35	28	1.2			53.5	
Inst.	18	67	35	47	1.4			69.5	
48,000 Ft.									
260,000 Lbs.									
202 Knots									

d. All data under stabilized conditions of airspeed and normal acceleration during which the airplane was in first buffet were combined with initial buffet high-speed data to provide a plot of maximum lift coefficient at first buffet versus Mach number. A criterion of ±0.02g to ±0.05g was used to determine initial buffet. This plot as presented in Figure 273 of Appendix IA and summarized below indicates a considerable band of lift coefficients in which airplane buffet could be obtained.

MAXIMUM LIFT COEFFICIENT FOR FIRST BUFFET

Mach No.	Lift Coefficient
0.9	0.250
0.8	0.680
0.7	0.850
0.6	0.915
0.5	0.940
0.4	0.950
0.3	0.955

e. Full power turns at stabilized conditions of airspeed and altitude were conducted at 30,000 feet, 40,000 feet, 48,000 feet and 50,000 feet to determine the maximum lift coefficient and maximum normal acceleration obtainable at constant altitude and full power. The results of these tests as presented in Figure 274 of Appendix IA and summarized in the following tables indicate that the optimum turning speed is from .76 to .78 Mach number:

MAXIMUM LIFT COEFFICIENT AND NORMAL ACCELERATION AT FULL POWER AND CONST. ALTITUDE

Gross Weight Pounds	Altitude Feet	Mach Number	Peak Normal Acceleration "g"	Lift Coefficient
300,000	39,500	0.760	1.337	0.620
235,000	47,750	0.761	1.165	0.624
235,000	50,200	0.779	1.064	0.610

8. Static Longitudinal Stability

a. Variation of wheel force and elevator position with airspeed was obtained by trimming the aircraft at the desired airspeed and altitude and then varying the airspeed by elevator alone. The same tests were repeated by trimming the stabilizer to vary the airspeed. In the power-approach configuration, the stick-fixed and stick-free neutral points were aft of the most aft critical airplane loading. By reference to Figures 281 through 292 in Appendix IA, it can be seen that in the cruise configuration at 30,000 feet, the stick-fixed and stick-free neutral points were forward of the aft center-of-gravity limit at a $C_L = 0.215$ and a Mach number .847. In the power configuration at 48,000 feet, this same condition existed at $C_L = 0.485$ and a Mach number = 0.826

These conditions are considered satisfactory by reference to MIL-F-8785 since they occur in an area approaching the transonic region. However, bombing speeds will be in the range of 0.845 Mach number and care should be taken to keep the center of gravity well forward when anticipating operation in this range of airspeeds. The stabilizer neutral points were forward of the most aft center-of-gravity position in the same range of airspeeds as the stick-fixed neutral points. All static longitudinal data are presented in Figures 275 through 296 in Appendix IA and are summarized in the following tables:

STICK-FIXED STATIC LONGITUDINAL STABILITY

Configuration Altitude Gross Weight Trim CAS	Aft Center of Gravity Limit % MAC	Most Forward Stick-Fixed Neutral Point Locations		
		MIL-F-8785 CAS Range Knots	MIL-F-8785 % MAC	Test % MAC
Power Approach 10,000 Feet 230,000 Pounds 129 Knots	35	105 - 190	35	40.2
Power Approach 10,000 Feet 230,000 Pounds 129 Knots	35	105 - 190	35	41.2
Cruise 30,000 Feet 270,000 Pounds 300 Knots	35	196 - 341.5	35	28.2*
Cruise 30,000 Feet 260,000 Pounds 300 Knots	35	192 - 342	35	22.5*
Power 48,000 Feet 250,000 Pounds 210 Knots	35	158 - 213	35	18.0*
Power 48,000 Feet 250,000 Pounds 208 Knots	35	158 - 213	35	18.0*
Power and Tanks 48,000 Feet 250,000 Pounds 211 Knots	35	158 - 213	35	18.5*

* In speed range having compressibility effects

9. Longitudinal Trim Changes

a. The effect of changes in power, lifting devices, and external drag items on longitudinal trim were generally satisfactory; however in the aft center-of-gravity position full forward wheel would not hold trim airspeed when the wing flaps were lowered to 100% or speed brakes raised full up. This condition was somewhat alleviated with forward centers of gravity but a push force greater than 20 pounds as specified in MIL-F-8785 was required. In all cases at a trim speed of 350 knots, a push force greater than 20 pounds was required when speed brakes were raised to the No. 2 position. These data are presented inFigures 297 through 304 in Appendix IA and summarized in the following tables:

LONGITUDINAL TRIM CHANGES

	TRIM CONDITIONS						TRIM CHANGES		
Trimmed or Untrimmed	C.G. %MAC	IAS Knots	Spoiler Position	Landing Gear Position	Wing Flap Position	Variable Action	Elev. Force Pounds	Elev. Deflec. Degrees	Stab. Pos. Degrees
				Avg. Gross Wt. – 231,000 Pounds					
				Avg. Altitude – 11,000 Feet					
T	19.7	179.5	0	Up	Up	Initial Trim	0	1.5 N.D.	3.1 N.U.
U	19.7	179	0	Down	Up	Gear Down	0	1.5 N.D.	3.1 N.D.
T	19.7	180	0	Down	Up	Gear Down	0	1.5 N.D.	3.3 N.U.
U	19.7	174	0	Down	Down	Flaps Down	35 (Push)	16.5 N.D.	3.4 N.U.
T	19.7	179.5	0	Down	Down	Flaps Down	0	3.0 N.D.	0.8 N.D.
				Avg. Gross Wt. – 228,500 Pounds					
				Avg. Altitude – 11,000 Feet					
T	19.8	145	0	Down	Down	Initial Trim	0	2.5 N.D.	0.8 N.U.
U	19.8	141	0	Down	Down	Power Off	11 (Pull)	0	0.9 N.U.
T	19.8	149	0	Down	Down	Power Off	0	2 N.D.	1.6 N.U.
U	19.8	145	0	Down	Down	Power On	6 (Push)	5 N.D.	1.6 N.U.
T	19.8	144	0	Down	Down	Power On	0	3 N.D.	0.1 N.U.
U	19.8	143	0	Up	Down	Gear Up	10 (Push)	6 N.D.	0.1 N.U.
T	19.8	146.5	0	Up	Down	Gear Up	0	1 N.D.	0.9 N.D.
U	19.8	146.5	0	Up	Up	Flaps Up	24 (Pull)	16.5 N.U.	1.0 N.D.
T	19.8	146.5	0	Up	Up	Flaps Up	1	1 N.U.	4.2 N.U.

LONGITUDINAL TRIM CHANGES

	TRIM CONDITIONS						TRIM CHANGES		
Trimmed or Untrimmed	C.G. %MAC	IAS Knots	Spoiler Position	Landing Gear Position	Wing Flap Position	Variable Action	Elev. Force Pounds	Elev. Deflec. Degrees	Stab. Pos. Degrees
Avg. Gross Wt. – 223,500 Pounds; Avg. Altitude – 11,000 Feet									
T	19.9	124	0	Down	Up	Initial Trim	0	5 N.D.	3.7 N.U.
U	19.9	125.5	#6	Down	Up	Speed Brakes Up	42 (Push)	16 N.D.	3.7 N.U.
T	19.9	125	#6	Down	Up	Speed Brakes Up	0	3 N.D.	0.3 N.D.
U	19.9	125	0	Down	Up	Speed Brakes Down	17 (Pull)	9 N.U.	0.3 N.D.
T	19.9	126.5	0	Down	Up	Speed Brakes Down	0	3 N.D.	3.1 N.U.
U	19.9	124	0	Down	Up	Power 100%	3 (Push)	4 N.D.	3.0 N.U.
T	19.9	123.5	0	Down	Up	Power 100%	0	2.5 N.D.	3.1 N.
Avg. Gross Wt. – 219,500 Pounds; Avg. Altitude – 11,000 Feet									
T	18.8	351.5	0	Up	Up	Initial Trim	0	0.5 N.D.	2.1 N.D.
U	18.8	347.5	0	Up	Up	Power Off	60 (Pull)	3.5 N.U.	2.1 N.D.
T	18.8	347.5	0	Up	Up	Power Off	0	1 N.D.	1.4 N.D.
T	18.8	351.5	0	Up	Up	Power On	0	1 N.D.	1.8 N.D.
U	18.8	351.5	#2	Up	Up	Speed Brakes #2	50 (Push)	5 N.D.	1.8 N.D.
T	18.8	348.5	#6	Up	Up	Speed Brakes #6	0	0.5 N.D.	3.2 N.D.
T	18.8	360.5	0	Up	Up	Final Trim Clean	0	1 N.D.	1.6 N.D.
Avg. Gross Wt. – 247,000 Pounds; Avg. Altitude – 10,000 Feet									
T	35.3	180.5	0	Up	Up	Initial Trim	0	2.5 N.D.	0.3 N.D.
U	35.3	178	0	Down	Up	Gear Down	7 (Pull)	2 N.D.	0.3 N.D.
T	35.3	182	0	Down	Up	Gear Down	0	2.5 N.D.	0
U	35.3	164	0	Down	Down	Flaps Down	28 (Push)	17 N.D.	0
T	35.3	180	0	Down	Down	Flaps Down	0	3 N.D.	3.7 N.D.
Avg. Gross Wt. – 244,500 Pounds; Avg. Altitude – 10,000 Feet									
T	35.2	143	0	Down	Down	Initial Trim	0	2.5 N.D.	4.2 N.D.
U	35.2	142	0	Down	Down	Power Off	8 (Pull)	0.5 N.D.	4.2 N.D.
T	35.2	145	0	Down	Down	Power Off	0	4 N.D.	2.7 N.D.
U	35.2	143	0	Down	Down	Power On	13 (Push)	8 N.D.	2.7 N.D.
T	35.2	146	0	Down	Down	Power On	0	2 N.D.	3.7 N.D.
U	35.2	146	0	Down	Up	Flaps Up	5 (Pull)	10 N.U.	3.7 N.D.
T	35.2	144	0	Down	Up	Flaps Up	0	1 N.D.	0.5 N.D.

LONGITUDINAL TRIM CHANGES

Trimmed or Untrimmed	C.G. % MAC	IAS Knots	Spoiler Position	Landing Gear Position	Wing Flap Position	Variable Action	Elev. Force Pounds	Elev. Deflec. Degrees	Stab. Pos. Degrees
	TRIM CONDITIONS						TRIM CHANGES		
					Avg. Gross Wt. – 239,000 Pounds				
					Avg. Altitude – 10,000 Feet				
T	36.1	123.5	0	Down	Up	Initial Trim	0	3.5 N.D.	3.0 N.D.
U	36.1	119	#6	Down	Up	Speed Brakes Up	55 (Push)	15 N.D.	3.3 N.D.
U	36.1	120.5	#6	Down	Up	Speed Brakes Up	35 (Push)	15 N.D.	4.0 N.D.
T	36.1	126.5	#6	Down	Up	Speed Brakes Up	0	3 N.D.	7.2 N.D.
U	36.1	125	0	Down	Up	Speed Brakes Down	11 (Pull)	7.5 N.U.	7.2 N.D.
T	36.1	122.5	0	Down	Up	Speed Brakes Down	0	2 N.D.	3.5 N.D.
U	36.1	123	0	Down	Up	Power 100%	3 (Push)	5 N.D.	3.5 N.D.
T	36.1	123	0	Down	Up	Power 100%	0	1.5 N.D.	4.8 N.D.
					Avg. Gross Wt. – 235,000 Pounds				
					Avg. Altitude – 10,000 Feet				
T	34.4	350	0	Up	Up	Initial Trim	0	2 N.D.	2.4 N.D.
U	34.4	346	0	Up	Up	Power Off	2 (Pull)	2 N.D.	2.4 N.D.
T	34.4	347.5	0	Up	Up	Power Off	0	2.5 N.D.	2.2 N.D.
T	34.4	353	0	Up	Up	Power On	0	2 N.D.	2.5 N.D.
U	34.4	355	#6	Up	Up	Speed Brakes Up	70 (Push)	8.5 N.D.	2.4 N.D.
T	34.4	346	#6	Up	Up	Speed Brakes Up	0	2 N.D.	5.9 N.D.

b. Below is a resumé of several items that exceeded the allowable force of 20 pounds push or pull:

UNSATISFACTORY TRIM CONDITIONS

C.G. % MAC	TRIM IAS KNOTS	VARIABLE ACTION	WHEEL FORCE CHANGE POUNDS
19.7	180	Flaps Down	35 Push
19.8	145	Flaps Up	24 Pull
19.9	125	Speed-Brakes Full Up	42 Push
18.8	350	Power Off	60 Pull
18.8	350	Speed-Brakes To #2	50 Push
35.3	180	Flaps Down	35 Push
36.1	125	Speed-Brakes Full Up	55 Push
34.4	350	Speed-Brakes To #2	70 Push

10. Dynamic Longitudinal Stability

a. Dynamic longitudinal tests were conducted at 10,000 feet, 30,000 feet, and 48,000 feet at forward and aft center of gravity positions. All data were obtained by abruptly displacing the controls and bringing them back to the approximate trim position. All configurations tested except the power approach configuration at a forward C.G. failed to meet the requirement of MIL-F-8785 that the oscillations of normal acceleration damp to 1/2 amplitude in one cycle. This could be attributed to body bending since the fuselage is relatively long and is of flexible structure. It is significant to note that the elevator oscillations damped to zero in 1/2 to 3/4 cycles in all cases. In the forward C.G. power approach configuration at 10,000 feet the oscillations of normal accelerations damped to 1/2 amplitude in 0.25 cycles for a positive disturbance and in 0.5 cycles for a negative disturbance. All data are presented in the form of time histories in Figures 305 thru 346 in Appendix IA and summarized in the following tables:

DYNAMIC LONGITUDINAL STABILITY

Configuration	Control Column Action	Center of Gravity (% MAC)	Trim C.A.S. (Knots)	Altitude (Feet)	Cycles to Damp to ½ Amplitude	Amplitude of Residual Oscillations
		Controls Fixed				
Power Approach	Pull	18.9	130	10,000	.25	0
Power Approach	Push	18.9	130	10,000	.5	±.06g
Power Approach	Pull	34.8	131.5	9,500	2.5	±.08g
Power Approach	Push	34.8	131.5	9,500	2.0	±.08g
Cruise	Pull	18.9	223.5	29,700	1.5	±.04g
Cruise	Push	18.9	223.5	29,700	1.5	±.07g
Cruise	Pull	35.5	222.5	29,700	1.25	±.10g
Cruise	Push	35.5	222.5	29,700	.75	±.04g
Cruise	Pull	19.4	303	29,700	2.0	±.09g
Cruise	Push	19.4	303	29,700	2.0	±.06g
Cruise	Pull	35.7	304	29,900	2.5	±.08g
Cruise	Push	35.7	304	29,900	2.5	±.08g
Cruise **	Pull	19.0	299	30,600	3.0	±.10g
Cruise **	Push	19.0	299	30,600	2.25	±.08g
Cruise **	Pull	32.2	299.5	30,200	2.0	±.10g
Cruise **	Push	32.2	299.5	30,200	2.25	±.10g
Power	Pull	19.2	340.5	30,000	1.5	±.20g
Power	Push	19.2	340.5	30,000	2.5	±.09g
Power	Pull	35.6	341.5	29,900	1.5	±.15g
Power	Push	35.6	341.5	29,900	2.0	±.15g
Cruise	Pull	17.0	180.5	46,800	2.0	±.08g
Cruise	Push	17.0	180.5	46,800	1.0	±.07g
Cruise	Pull	34.0	173	47,700	1.5	±.15g
Cruise	Push	34.0	173	47,700	2.5	±.10g
Cruise	Pull	18.3	207.5	46,800	2.0	±.10g
Cruise	Push	18.3	207.5	46,800	1.5	±.10g
Cruise	Pull	33.9	200.5	48,000	1.5	±.15g
Cruise	Push	33.9	200.5	48,000	1.5	±.10g
Power	Pull	19.1	220.5	46,700	1.5	±.10g
Power	Push	19.1	220.5	46,700	1.0	±.07g
Power	Pull	33.7	217.5	48,000	2.0	±.20g
Power	Push	33.7	217.5	48,000	2.0	±.06g
Cruise **	Pull	18.4	203	47,800	2.0	±.10g
Cruise **	Push	18.4	203	47,900	1.5	±.08g
Cruise **	Pull	33.5	201.5	48,100	1.5	±.10g
Cruise **	Push	33.5	201.5	48,100	1.5	±.11g
Cruise *	Pull	34.0	173.5	47,700	2.5	±.12g
Cruise *	Push	34.0	173.5	47,700	2.0	±.09g
Cruise *	Pull	34.3	198.5	47,700	2.25	±.20g
Cruise *	Push	34.3	198.5	47,700	2.0	±.15g
Power *	Pull	34.5	215.5	47,700	1.5	±.17g
Power *	Push	34.5	215.5	47,700	1.5	±.15g

** External Tanks Installed
* Bomb Bay Doors Open

11. Static Directional Stability

a. Static directional tests were conducted at 10,000 feet, 30,000 feet, and 47,000 feet. Data were obtained by producing varying degrees of sideslip with rudder application and applying opposite aileron and spoiler to maintain a constant heading. Under all conditions tested, the sideslip characteristics were considered satisfactory. All requirements of MIL-F-8785 were met with the exception that aileron forces tended to lighter near the maximum sideslip angle of 3.5 degrees. It is significant to note that in MIL-F-8785 there is no requirement for sideslip capabilities in an aircraft equipped with a cross-wind landing gear. The results of these tests are presented in Figures 347 thru 349 in Appendix IA and are summarized in the following table:

STATIC DIRECTIONAL STABILITY

Configuration CAS	Elevator Force at S.S. Angle Produced by 50 Lbs. Rudder Force		Maximum Sideslip Angle		Maximum Rudder Deflec.		Rudder Force At Max. Deflec.		Total Aileron Deflec. At Max. Rudder	
	Rudder		Sideslip		Rudder		Rudder		Rudder	
	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
				11,100 FEET						
				Average Weight – 227,000 Lbs.						
Power Approach 130 Knots	½ Pull	2 Push	2.8	3.1	14.8	11.0	117	118	7.5 Rt.	6.5 Lft.
				30,500 FEET						
				Average Weight – 243,500 Lbs.						
Cruise 300 Knots	3 Push	3 Push	1.6	.7	8.1	3.9	155	225	3.8 Rt.	6.3 Lft.
				46,900 FEET						
				Average Weight – 260,000 Lbs.						
Power 215 Knots	4-½ Pull	3 Pull	1.4	1.4	7.8	7.0	240	235	10.6 Rt.	6.4 Lft.

12. Rudder Control Effectiveness

a. Rudder control effectiveness tests were conducted to determine the ability of the rudder to counteract yaw caused by loss of power of one or more outboard engines. The airplane was trimmed at 10,000 feet with gear and flaps down at 170 knots and various numbers of outboard engines were shut down. The results of this data as shown in Figures 350 and 351 of Appendix IA indicate that with two outboard engines shut down a constant heading sideslip can be maintained with 4 degrees of bank angle at 112 knots and a gross weight of 215,000 pounds. This airspeed is 14 knots slower than specified in MIL-F-8785. It is concluded that the low speed asymmetric power capabilities of this airplane are a result of spoiler action rather than rudder action. The results of these tests are summarized in the following table:

RUDDER CONTROL EFFECTIVENESS

CONFIGURATION	ENGINES OFF	CAS	SIDE-SLIP	BANK ANGLE	AVERAGE SPOILER POS. ON WING WITH ALL ENGINES OPERATING
	GROSS WEIGHT 238,000 LBS., ALTITUDE 9,000 FEET				
TAKEOFF	0	168	0	0	0
	#1	168	.4 RT.	1.0 RT.	5.8
		155	.4 RT.	1.5 RT.	7.3
		147	.4 RT.	1.8 RT.	6.3
		131	.4 RT.	2.0 RT.	10.0
		120	1.0 RT.	1.8 RT.	13.5
		115	1.4 RT.	2.0 RT.	14.5
	GROSS WEIGHT 235,000 LBS., ALTITUDE 9,590 FEET				
TAKEOFF	0	168	0	0	0
	#1,2	169	1.0 RT.	2.0 RT.	12.5
		159	1.5 RT.	3.3 RT.	13.5
		144	2.5 RT.	3.5 RT.	16.8
		132	3.1 RT.	3.5 RT.	19.8
		121	3.7 RT.	3.7 RT.	25.0
		113	4.2 RT.	3.7 RT.	27.8

13. Lateral and Directional Trim

a. Lateral and directional trim tests were performed at 10,000 feet and 215,000 pounds gross weight. The airplane was trimmed for straight and level flight with gear and wing flaps down at 170 knots. One, two and three outboard engines were shut down on one side and control forces were reduced to zero by using trim. The lateral and directional trim capabilities were found to be satisfactory. With Engines No. 1, 2, and 3 shut down the airplane was flown in a constant heading sideslip with less than 4 degrees of bank angle at an indicated airspeed of 113 knots. All data for these tests are presented in Figures 253 through 354 in Appendix IA and are summarized in the following tables:

LATERAL AND DIRECTIONAL TRIM

Config.	Engines Off	CAS	Side-Slip	Bank Angle	Aileron Position	Rudder Position	Spoiler Position on Wing with All Engines Operating
		Gross Weight 223,500 Lbs., Altitude 10,900 Feet					
Takeoff	0	171	0	0	0	0	0
	#1	168	0	.1 Rt.	2.5 Rt.	4 Rt.	0
		156	.1 Rt.	1.2 Rt.	8.0 Rt.	7 Rt.	0.8
		145	.2 Rt.	1.9 Rt.	8.0 Rt.	8 Rt.	2.8
		133	.4 Rt.	1.9 Rt.	9.1 Rt.	10 Rt.	2.3
		125	.5 Rt.	1.9 Rt.	10.2 Rt.	11 Rt.	2.3
		115	.6 Rt.	1.9 Rt.	12.3 Rt.	11 Rt.	7.0
		106	.7 Rt.	1.8 Rt.	15.0 Rt.	11.5 Rt.	12.8
		95	.9 Rt.	1.8 Rt.	19.3 Rt.	11.5 Rt.	25.0
		Gross Weight 214,000 Lbs., Altitude 9,000 Feet					
Takeoff	0	164	0	0	0	0	0
	#1,2	165	1.5 Rt.	3 Rt.	18. Rt.	10 Rt.	11.3
		153	2.1 Rt.	4 Rt.	23.5 Rt.	10 Rt.	13.0
		141	2.6 Rt.	4 Rt.	28.0 Rt.	10 Rt.	16.5
		136	2.9 Rt.	4.1 Rt.	29.5 Rt.	10 Rt.	16.5
		117	3.5 Rt.	4.6 Rt.	31.5 Rt.	10 Rt.	22.3
		122	3.7 Rt.	4.7 Rt.	31.5 Rt.	10 Rt.	21.0
		113	4.3 Rt.	5.0 Rt.	31.5 Rt.	10 Rt.	24.3

LATERAL AND DIRECTIONAL TRIM

Config.	Engines Off	CAS	Side-Slip	Bank Angle	Aileron Position	Rudder Position	Spoiler Position on Wing with All Engines Operating
		Gross Weight 209,000 Lbs., Altitude 9,900 Feet					
Takeoff	0	170	0	0	0	0	0
	#1,2,3	163	2.2 Rt.	4.5 Rt.	19.0 Rt.	10 Rt.	14.5
		143	3.6 Rt.	6.3 Rt.	31.0 Rt.	10 Rt.	17.5
		132	4.4 Rt.	6.8 Rt.	32.0 Rt.	10 Rt.	24.5
		120	5.2 Rt.	6.8 Rt.	32.0 Rt.	10 Rt.	29.0
		112	6.5 Rt.	5.8 Rt.	32.0 Rt.	10 Rt.	35.0

b. The configuration of the internal rudder balance panel was changed before lateral-directional damping tests were performed, hence there is no comparative data between the two configurations. This modification consisted of removal of the balance panel regulator plugs in the area of 15 degrees of travel on either side of center. Since the maximum in-flight rudder deflection is 10 degrees, the regulator plugs have no effect on aerodynamic balancing of the rudder. This should not be construed to mean that the rudder balance panel is no longer effective but rather to indicate that the amount of air passing through the balance panel is not regulated throughout the in-flight range of rudder deflections.

14. Dynamic Lateral – Directional Stability

a. Dynamic lateral-directional tests were performed at 10,000 feet, 30,000 feet, and 48,000 feet. The tests were accomplished by placing the airplane in a sideslip and abruptly returning the controls to the neutral position. With gear and flaps extended at 10,000 feet, the lateral-directional damping characteristics were satisfactory. In the cruise configuration at 10,000 feet and 30,000 feet the damping characteristics were satisfactory; however, at 48,000 feet, in both the cruise and power configuration, the number of cycles required for sideslip and bank angle to damp to one-half amplitude exceeded the limits of MIL-F-8785 by an average factor of 1.2. These data are presented in the form of time histories inFigures 357 through 376 in Appendix IA and are summarized in the following tables. At 48,000 feet in the cruise and power configurations with the bomb bay doors open, the number of cycles required to damp to one-half amplitude exceeded the specification by an average factor of 3.3. The magnitude of the residual undamped oscillations also exceeded ±5 mils as outlined in MIL-F-8785. This is considered highly unsatisfactory in the bombing configuration. It may also be pointed out that the bomb bay doors will not be open until 2-4 seconds prior to bomb release; however, the damping characteristics with bomb bay doors closed still exceed the specification by an average factor of 1.2. The addition of external tanks does not appreciably affect the lateral-directional damping characteristics at any altitude. The data for all dynamic lateral-directional tests are presented in Figures 355 through 382 in Appendix IA and summarized in the following tables:

DYNAMIC LATERAL-DIRECTIONAL STABILITY

Configuration	Trim CAS Knots	Trim Alt. Feet	Cycles to Damp Sideslip Oscillation to ½ Amplitude	MIL-F-8785 Allowable cycles to damp to ½ Amplitude
		Controls Fixed		
Power Approach	128	10,600	1.5	0.9
Power Approach	128	10,600	1	1.4
Cruise	324	10,000	1	1.4
Cruise	324	10,000	0.5	1.4
Cruise	223.5	29,700	1	1.4
Cruise	223.5	29,700	1.5	1.4
Cruise	303	29,700	0.75	1.4
Cruise	303	29,700	0.75	1.4
Cruise *	300	30,700	1.25	1.4
Cruise *	300	30,700	0.75	1.4
Cruise *	299.5	30,200	1.5	1.4
Cruise *	299.5	30,200	1.25	1.4
Cruise	180.5	46,800	1.5	1.3
Cruise	180.5	46,800	1.5	0.9
Cruise	207.5	46,800	2	1.4
Cruise	207.5	46,800	1.25	0.6
Power	220.5	46,700	1.5	1.4
Power	220.5	46,700	1	0.7
Cruise *	202.5	47,900	1.25	1.4
Cruise *	202.5	47,900	1.5	1.3
Cruise *	201.5	48,100	3.5	0.5
Cruise *	201.5	48,100	2	1.4
Cruise **	173.5	47,700	2	0.6
Cruise **	173.5	47,700	2	0.6
Cruise **	198.5	47,700	3	0.6
Cruise **	198.5	47,700	1.5	0.6
Power **	215.5	47,700	2	0.6
Power **	215.5	47,700	1.5	0.6

* External Tanks Installed
** Bomb Bay Doors Open

15. Lateral Control

a. Aileron and spoiler characteristics were investigated at 15,000 feet, 20,000 feet, and 48,000 feet. In the cruise configuration at 48,000 feet, the roll rates at cruise airspeed were satisfactory. At 20,000 Feet in the cruise configuration the roll rates with rudder used were satisfactory throughout the speed range; however, with rudder pedals fixed the roll rates at 160 knots were 17% lower and at 350 knots were 10% lower than specified in MIL-F-8785. The effect of external tanks on rolling characteristics was negligible. These data are presented in Figures 383 through 411 in Appendix IA and are summarized in the following tables.

SUMMARY OF ROLL RATES

Configuration and Altitude	CAS Knots	Test Roll Rate Deg/Sec Left	Test Roll Rate Deg/Sec Right	MIL-F-8785 Roll Rate Deg/Sec	Notes
Cruise 20,000 Feet	160	13.5	12.5	15.8	Spoilers Used Rudder Pedals Fixed
	250	25.8	24.2	23.8	
	350	20.0	17.5	21.7	
	350*	19.2	21.1	21.7	
Cruise 20,000 Feet	160	16.0	16.0	15.8	Spoilers Used Rudder Used
	250	26.0	22.0	23.8	
	350	21.0	20.5	21.7	
	350*	20.7	22.5	21.7	
Cruise 20,000 Feet	160	2.7	2.7	15.8	Spoilers Inoperative Rudder Pedals Fixed
	250	6.3	5.5	23.8	
	310	10.0	7.0	23.2	
	350*	8.0	99.0	21.7	
Cruise 20,000 Feet	160	10.5	5.0	15.8	Spoilers Inoperative Rudder Used
	250	11.2	8.5	23.8	
	350*	9.6	9.6	21.7	
Cruise 48,000 Feet	200	25.1	25.7	19.4	Spoilers Used Rudder Pedals Fixed
	200	27.0	27.8	19.4	Spoilers Used Rudder Used
	203*	26.0	24.2	19.4	Spoilers Used Rudder Used
	200	10.9	11.8	19.4	Spoilers Inoperative Rudder Pedal Fixed
	200	12.0	13.0	19.4	Spoilers Inoperative Rudder Used
Power Approach 15,000 Feet All Spoilers Inoperative On Right Wing	130*	---	0.6	11.9	Rudder Pedals Fixed
	130*	---	1.4	11.9	**Full Rudder Trim Used
	130*	---	1.5	11.9	Full Rudder & Rudder Trim Used
	160*	---	1.8	14.7	Rudder Pedals Fixed
	160*	---	4.0	14.7	Full Rudder Trim Used
	160*	---	5.0	14.7	Full Rudder & Rudder Trim Used

* External Tanks Installed

** Left Wing Spoilers No. 1 Position at Trim

b. In the approach configuration a limited amount of quantitative data was obtained. It can be seen from Figure 391 in Appendix IA and from the above summary that, in this configuration with spoilers inoperative, the roll rates are in the magnitude of 1 to 1½ degrees per second. Under these conditions it is highly improbable that a safe approach and landing could be accomplished. With wing flaps and gear up the roll rate at 160 knots was in the order of 4 to 5 degrees per second. These data are presented in the form of time histories in Figures 412 through 419 in Appendix IA. A complete quantitative analysis throughout the speed range in the approach configuration will be presented in Addendum I to this report.

c. In the event of spoilers becoming inoperative on one side only, an effort was made to determine if the lateral control in both directions could be balanced out. The airplane was trimmed with the left-hand spoilers at the No. 1 position. However, as can be seen in Figure 391 of Appendix IA the roll rate to the right was hardly appreciable. Although no rolls to the left are shown, a qualitative analysis revealed that the roll rates to the left and right were considerably different.

d. The time delay between control initiation and the point at which peak roll rate is reached falls within the specification limit of 2.35 seconds for all configurations with spoilers operative. With the spoilers inoperative at 48,000 feet, this time delay is an average of 6% greater than the specification. These data are presented in Figures 392 through 411 of Appendix IA and summarized in the following tables.

TIME LAPSE BETWEEN CONTROL INITIATION AND PEAK ROLL RATE

Configu-ration	External Tanks Installed	Rudder Pedals	Altitude	C. A. S	Gross Weight	Test Time to Reach Peak Roll Rate	MIL-F-8785 Time to Reach Peak Roll Rate
Cruise	No	Fixed	19,700	160.5	243,000	1.40	2.35
Cruise	No	Used	19,700	160.5	243,000	1.20	2.35
Cruise*	No	Fixed	19,700	160.5	243,000	.90	2.35
Cruise*	No	Used	19,700	160.5	243,000	2.30	2.35
Cruise*	No	Used	19,700	160.5	243,000	2.20	2.35
Cruise	No	Fixed	20,500	250.5	244,500	1.20	2.35
Cruise	No	Used	20,500	250.5	244,500	1.30	2.35
Cruise*	No	Fixed	20,500	250.5	244,500	2.20	2.35
Cruise*	No	Used	20,500	250.5	244,500	2.10	2.35
Cruise*	No	Used	20,500	250.5	244,500	2.00	2.35
Cruise	No	Fixed	19,900	349	254,000	1.1	2.35
Cruise	No	Used	19,900	349	254,000	1.0	2.35
Cruise*	No	Fixed	19,900	349	254,000	1.0	2.35
Cruise*	No	Used	19,900	349	254,000	.5	2.35
Cruise	Yes	Fixed	20,100	346	276,500	1.40	2.35
Cruise	Yes	Used	20,100	346	276,500	1.80	2.35
Cruise*	Yes	Fixed	20,100	346	276,500	1.80	2.35
Cruise*	Yes	Used	20,100	346	276,500	2.10	2.35
Cruise	No	Fixed	47,500	203	258,000	1.30	2.35
Cruise	No	Used	47,500	203	258,000	1.50	2.35
Cruise	No	Used	47,500	203	258,000	1.50	2.35
Cruise*	No	Fixed	47,500	203	258,000	2.30	2.35
Cruise*	No	Used	47,500	203	258,000	2.50	2.35
Cruise*	No	Used	47,500	203	258,000	2.50	2.35
Cruise*	No	Used	47,500	203	258,000	2.40	2.35

* Spoilers Inoperative

16. Instrumentation and Data Reduction

1. Stability and control data were obtained to evaluate the handling characteristics of the aircraft and to determine conformance with USAF Specification MIL-F-8785. These data are presented graphically in Figures 209 through 419 in Appendix IA. Certain limitations of instrumentation and simplifying methods of data analysis were tolerated and are noted as follows:

a. Instrumentation was not dynamically calibrated.

b. Lift coefficients were sometimes obtained in climbs or dives and are presented uncorrected for this angle.

c. For static longitudinal tests at high Mach numbers, calibrated airspeed was corrected to a standard altitude. This was necessary because an excessive loss of altitude was required to obtain the higher airspeeds.

APPENDIX IA

TEST DATA

APPENDIX IA (CONTINUED)

TAKEOFF PERFORMANCE

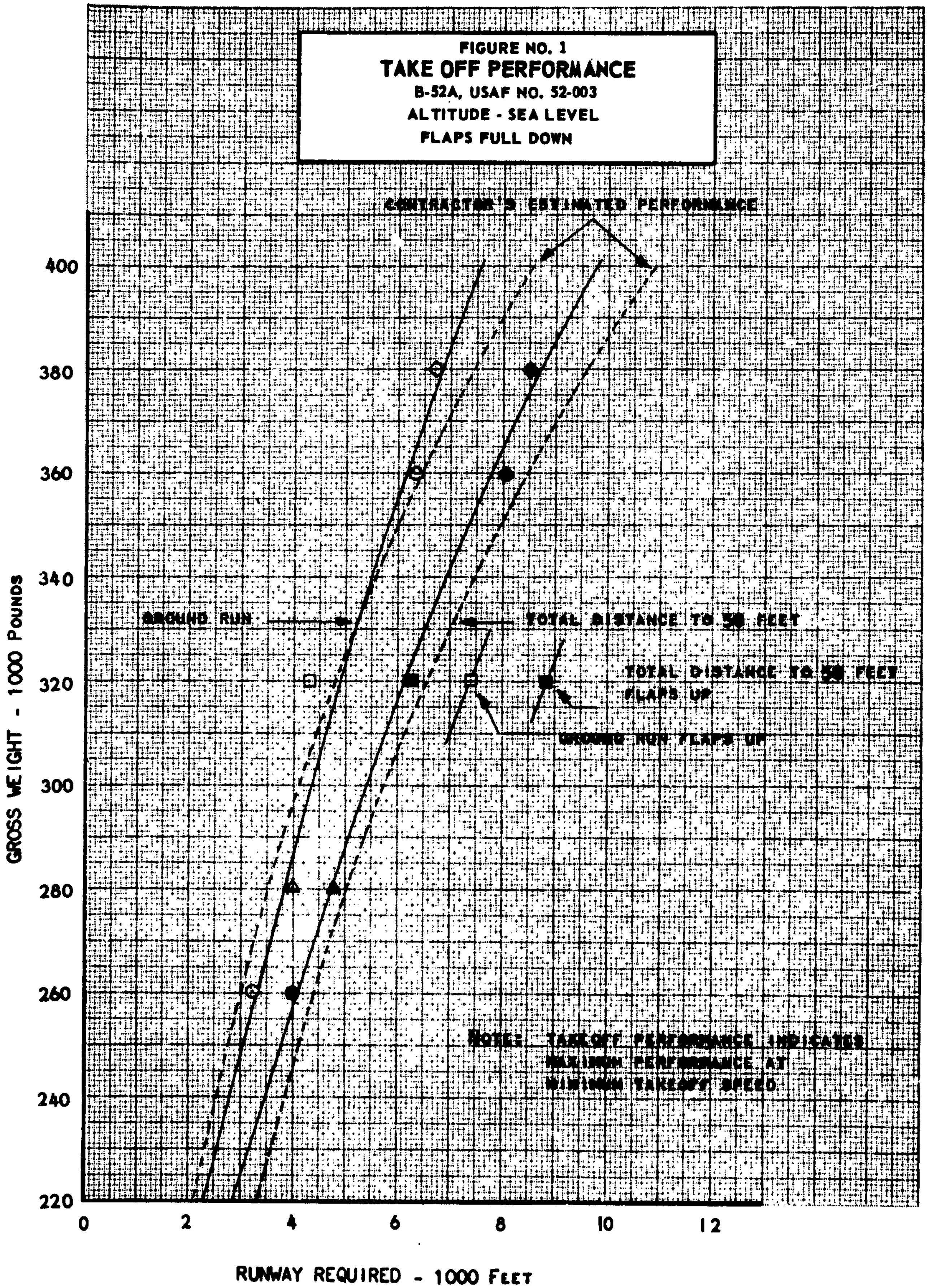

FIGURE NO. 1
TAKE OFF PERFORMANCE
B-52A, USAF NO. 52-003
ALTITUDE - SEA LEVEL
FLAPS FULL DOWN

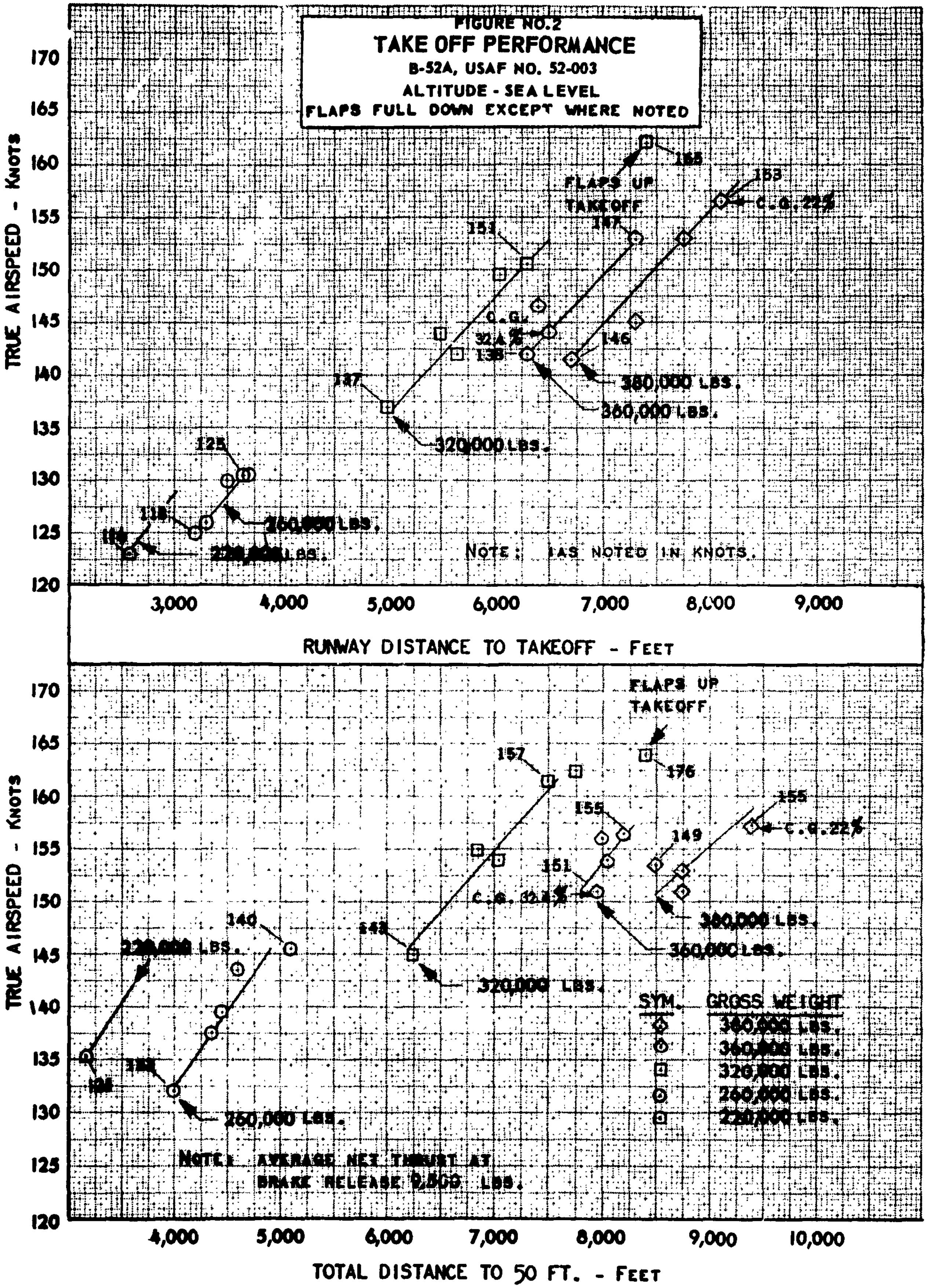
FIGURE NO.2
TAKE OFF PERFORMANCE
B-52A, USAF NO. 52-003
ALTITUDE - SEA LEVEL
FLAPS FULL DOWN EXCEPT WHERE NOTED
TRUE AIRSPEED - KNOTS
RUNWAY DISTANCE TO TAKEOFF - FEET
FLAPS UP TAKEOFF
C.G. 22%
C.G. 32.4%
380,000 LBS.
360,000 LBS.
320,000 LBS.
260,000 LBS.
220,000 LBS.
NOTE: IAS NOTED IN KNOTS.
TOTAL DISTANCE TO 50 FT. - FEET
SYM. GROSS WEIGHT
NOTE: AVERAGE NET THRUST AT BRAKE RELEASE 9,500 LBS.

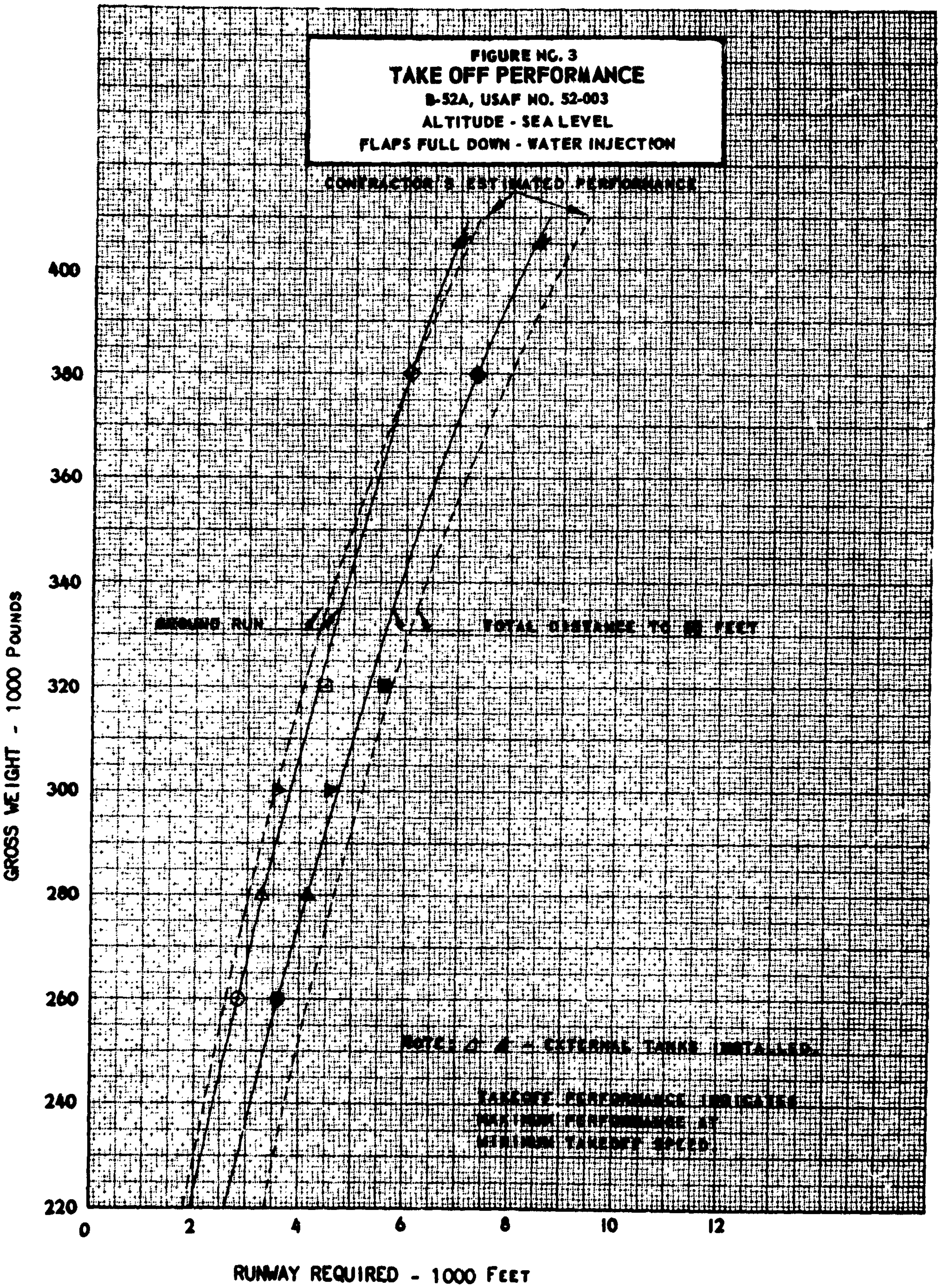
FIGURE NO. 3
TAKE OFF PERFORMANCE
B-52A, USAF NO. 52-003
ALTITUDE - SEA LEVEL
FLAPS FULL DOWN - WATER INJECTION
CONTRACTOR'S ESTIMATED PERFORMANCE
GROUND RUN
TOTAL DISTANCE TO 50 FEET
GROSS WEIGHT - 1000 POUNDS
220
240
260
280
300
320
340
360
380
400
0
2
4
6
8
10
12
RUNWAY REQUIRED - 1000 FEET

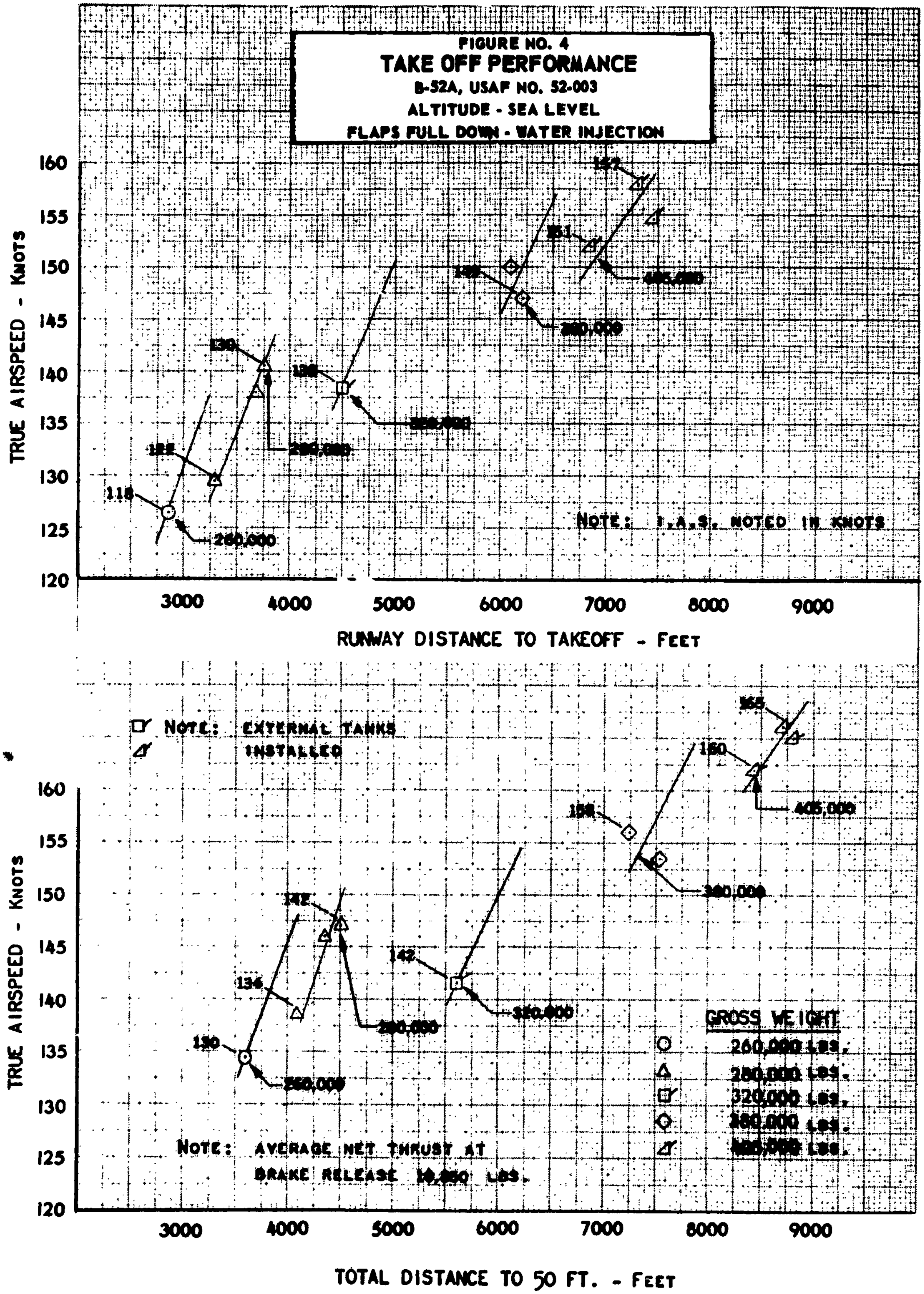
FIGURE NO. 4
TAKE OFF PERFORMANCE
B-52A, USAF NO. 52-003
ALTITUDE - SEA LEVEL
FLAPS FULL DOWN - WATER INJECTION
TRUE AIRSPEED - KNOTS
RUNWAY DISTANCE TO TAKEOFF - FEET
NOTE: I.A.S. NOTED IN KNOTS
NOTE: EXTERNAL TANKS INSTALLED
TOTAL DISTANCE TO 50 FT. - FEET
NOTE: AVERAGE NET THRUST AT BRAKE RELEASE [illegible] LBS.
GROSS WEIGHT
260,000 LBS.
280,000 LBS.
320,000 LBS.
380,000 LBS.
405,000 LBS.

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FOR CONVENIENCE OF

PRESENTING PLOTS

CLIMB PERFORMANCE

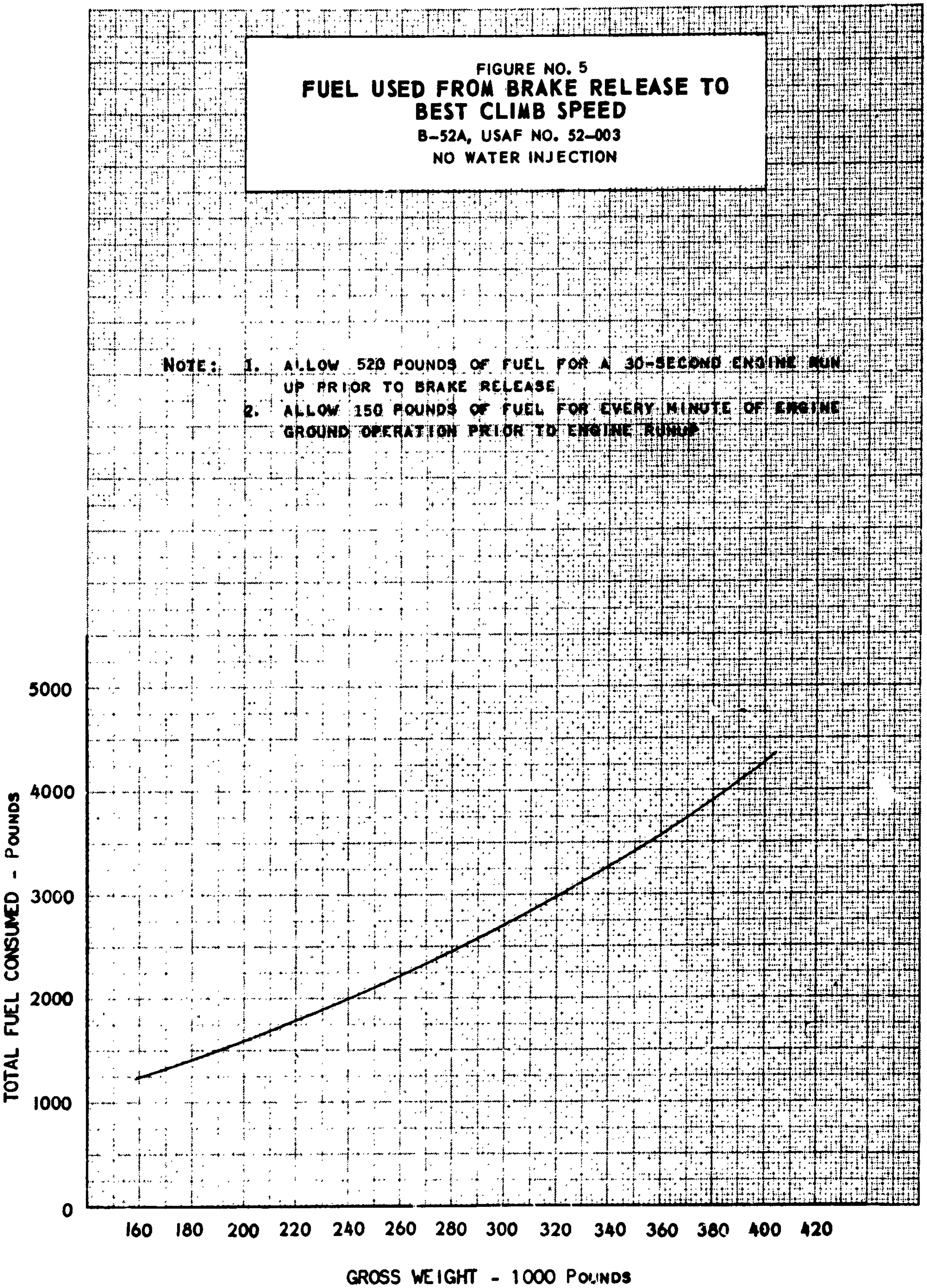


FIGURE NO. 5
FUEL USED FROM BRAKE RELEASE TO BEST CLIMB SPEED
B-52A, USAF NO. 52-003
NO WATER INJECTION
NOTE: 1. ALLOW 520 POUNDS OF FUEL FOR A 30-SECOND ENGINE RUN UP PRIOR TO BRAKE RELEASE
2. ALLOW 150 POUNDS OF FUEL FOR EVERY MINUTE OF ENGINE GROUND OPERATION PRIOR TO ENGINE RUNUP
TOTAL FUEL CONSUMED - POUNDS
0
1000
2000
3000
4000
5000
160
180
200
220
240
260
280
300
320
340
360
380
400
420
GROSS WEIGHT - 1000 POUNDS

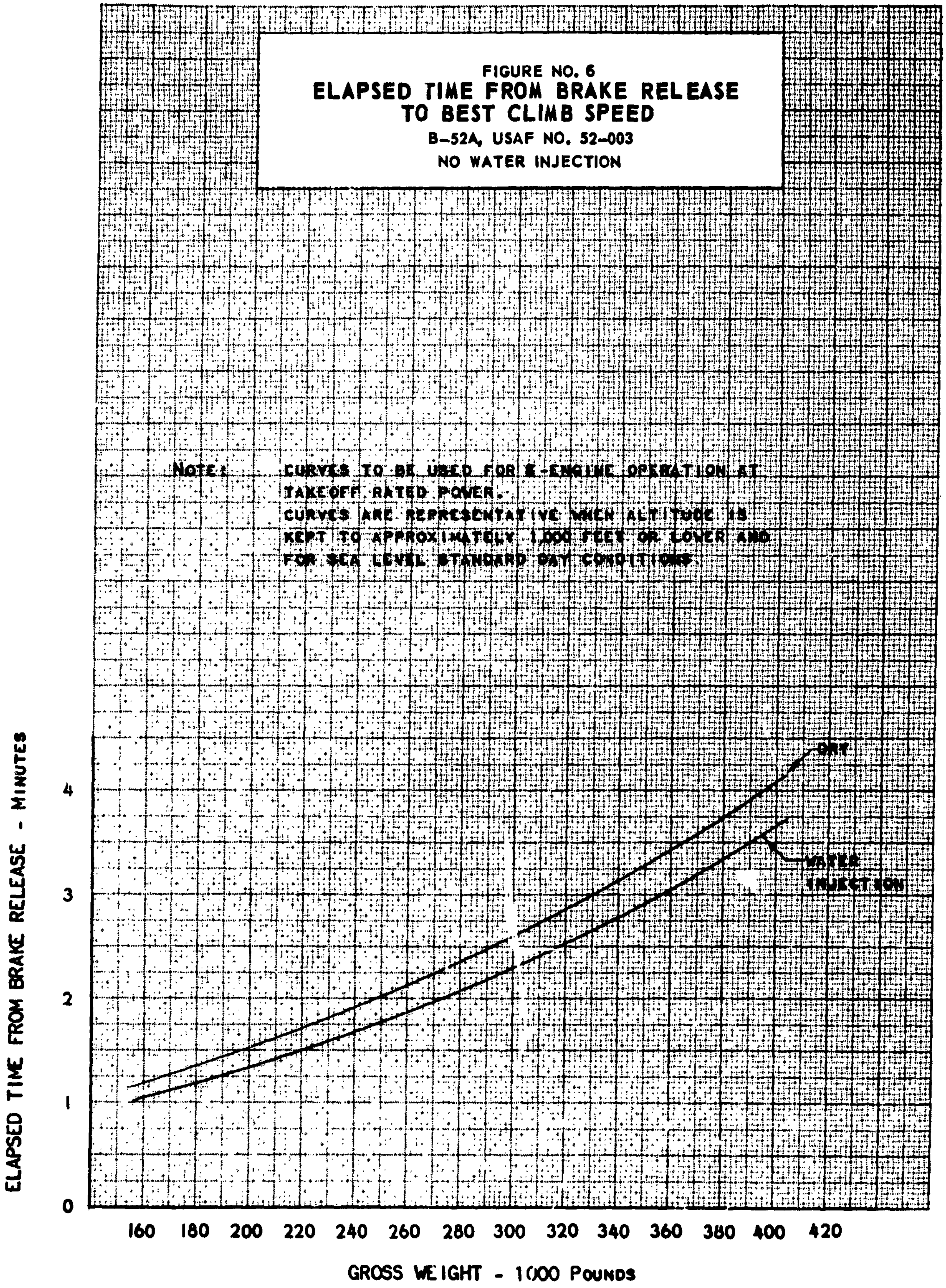


FIGURE NO. 6
ELAPSED TIME FROM BRAKE RELEASE TO BEST CLIMB SPEED
B-52A, USAF NO. 52-003
NO WATER INJECTION

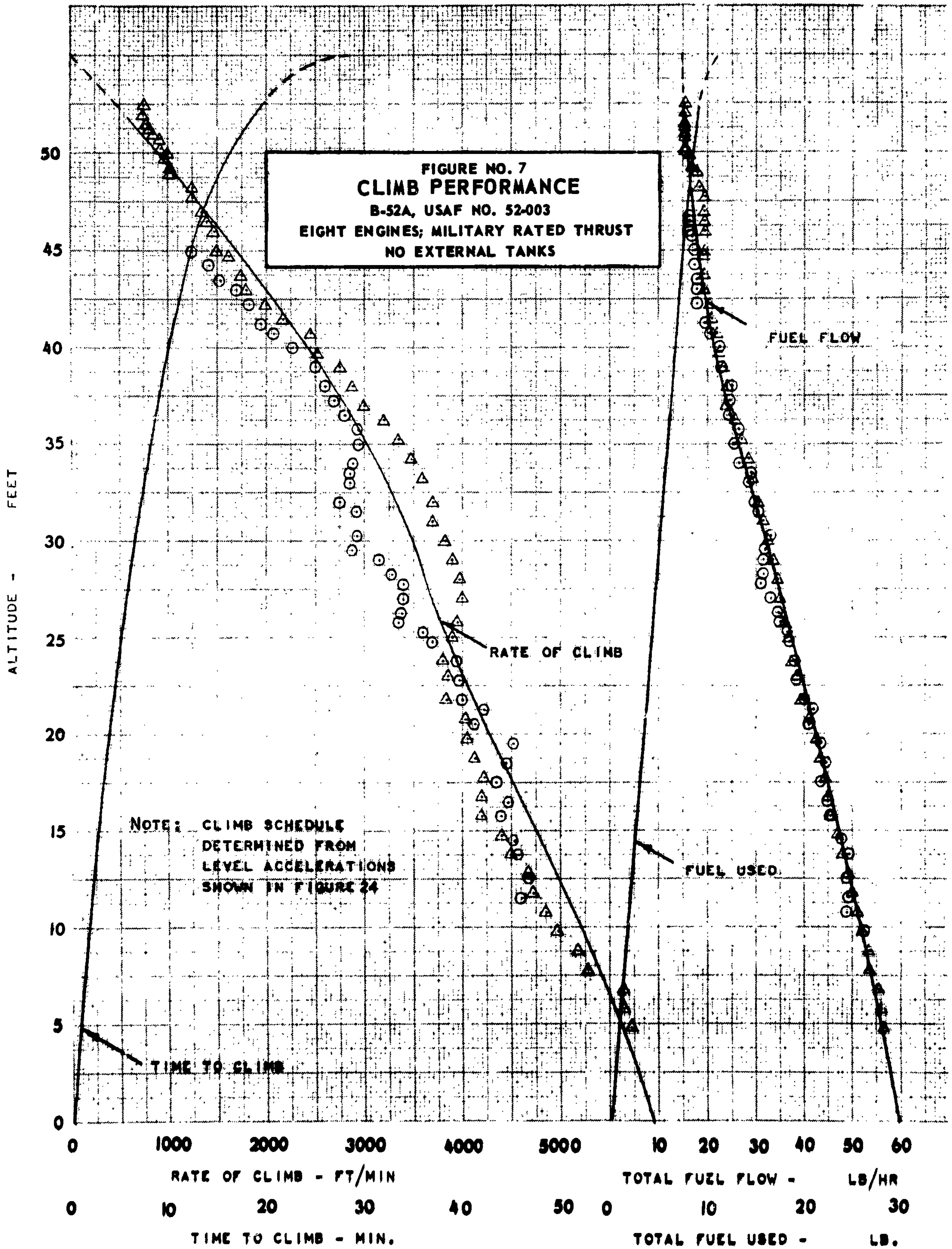
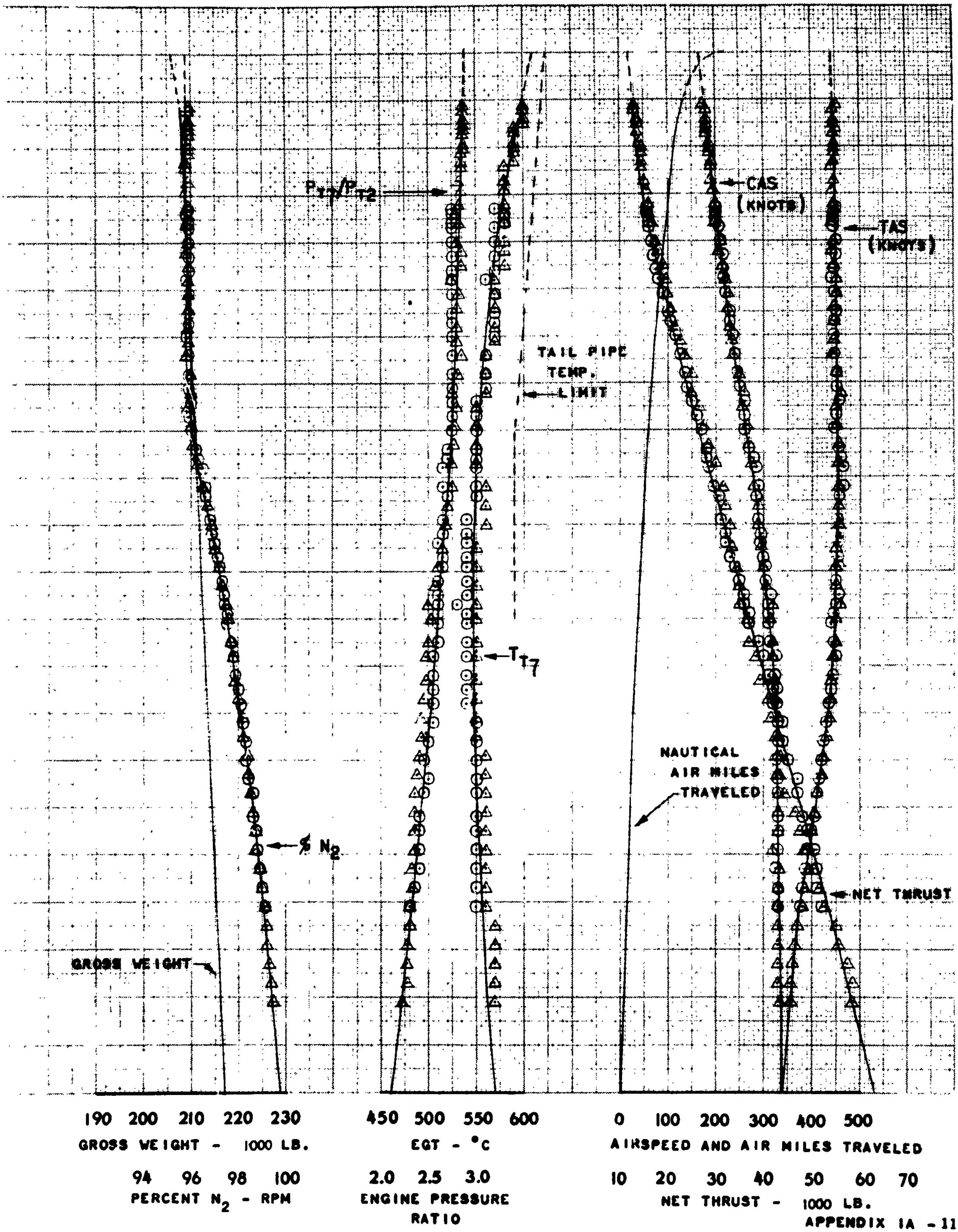


FIGURE NO. 7
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES; MILITARY RATED THRUST
NO EXTERNAL TANKS
ALTITUDE - FEET
0
5
10
15
20
25
30
35
40
45
50
FUEL FLOW
RATE OF CLIMB
NOTE: CLIMB SCHEDULE DETERMINED FROM LEVEL ACCELERATIONS SHOWN IN FIGURE 24
FUEL USED
TIME TO CLIMB
0
1000
2000
3000
4000
5000
RATE OF CLIMB - FT/MIN
10
20
30
40
50
60
TOTAL FUEL FLOW - LB/HR
0
10
20
30
40
50
TIME TO CLIMB - MIN.
0
10
20
30
TOTAL FUEL USED - LB.



P_{T7}/P_{T2}
CAS (KNOTS)
TAS (KNOTS)
TAIL PIPE TEMP. LIMIT
T_{T7}
NAUTICAL AIR MILES TRAVELED
% N_2
NET THRUST
GROSS WEIGHT
190 200 210 220 230
GROSS WEIGHT - 1000 LB.
94 96 98 100
PERCENT N_2 - RPM
450 500 550 600
EGT - °C
2.0 2.5 3.0
ENGINE PRESSURE RATIO
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

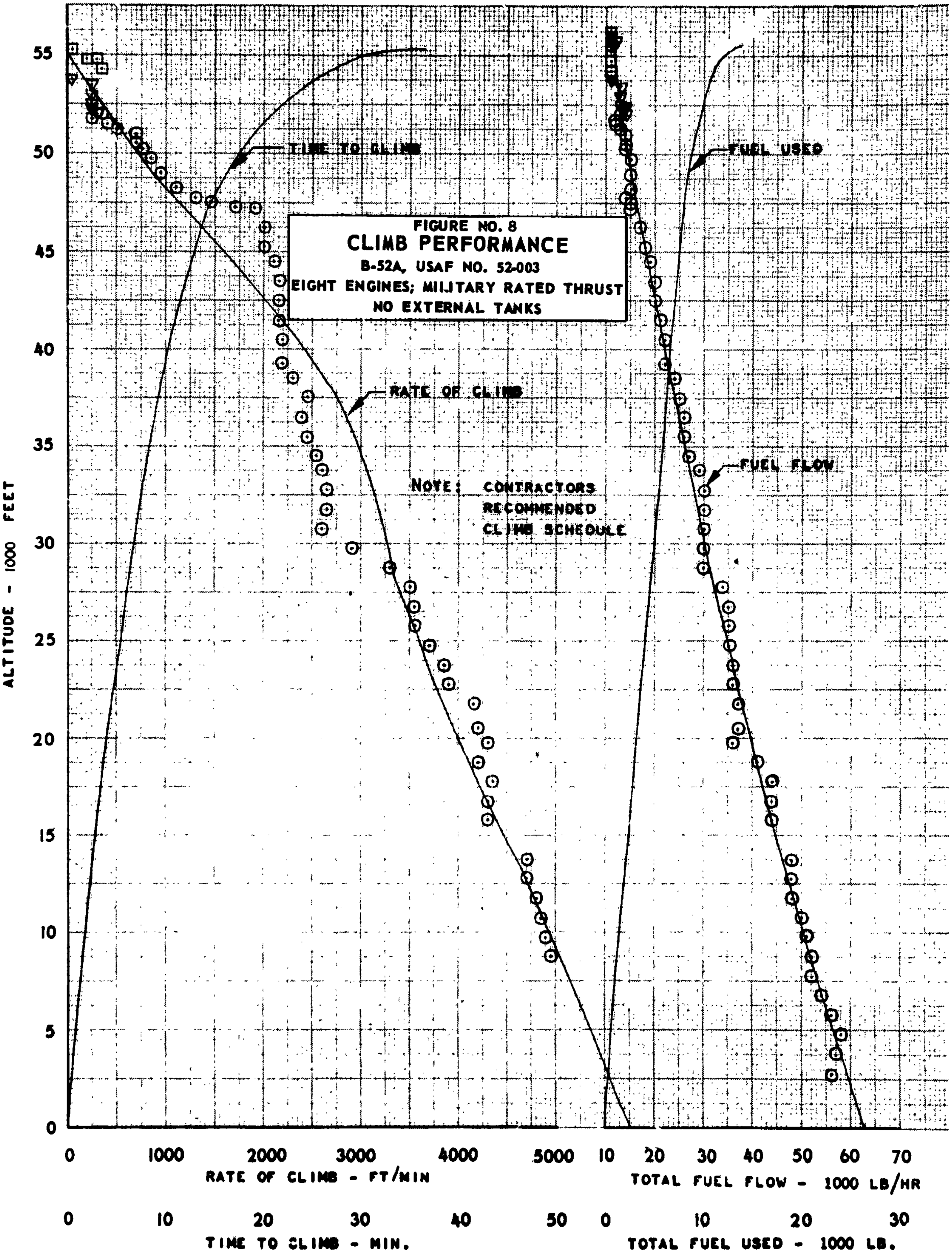
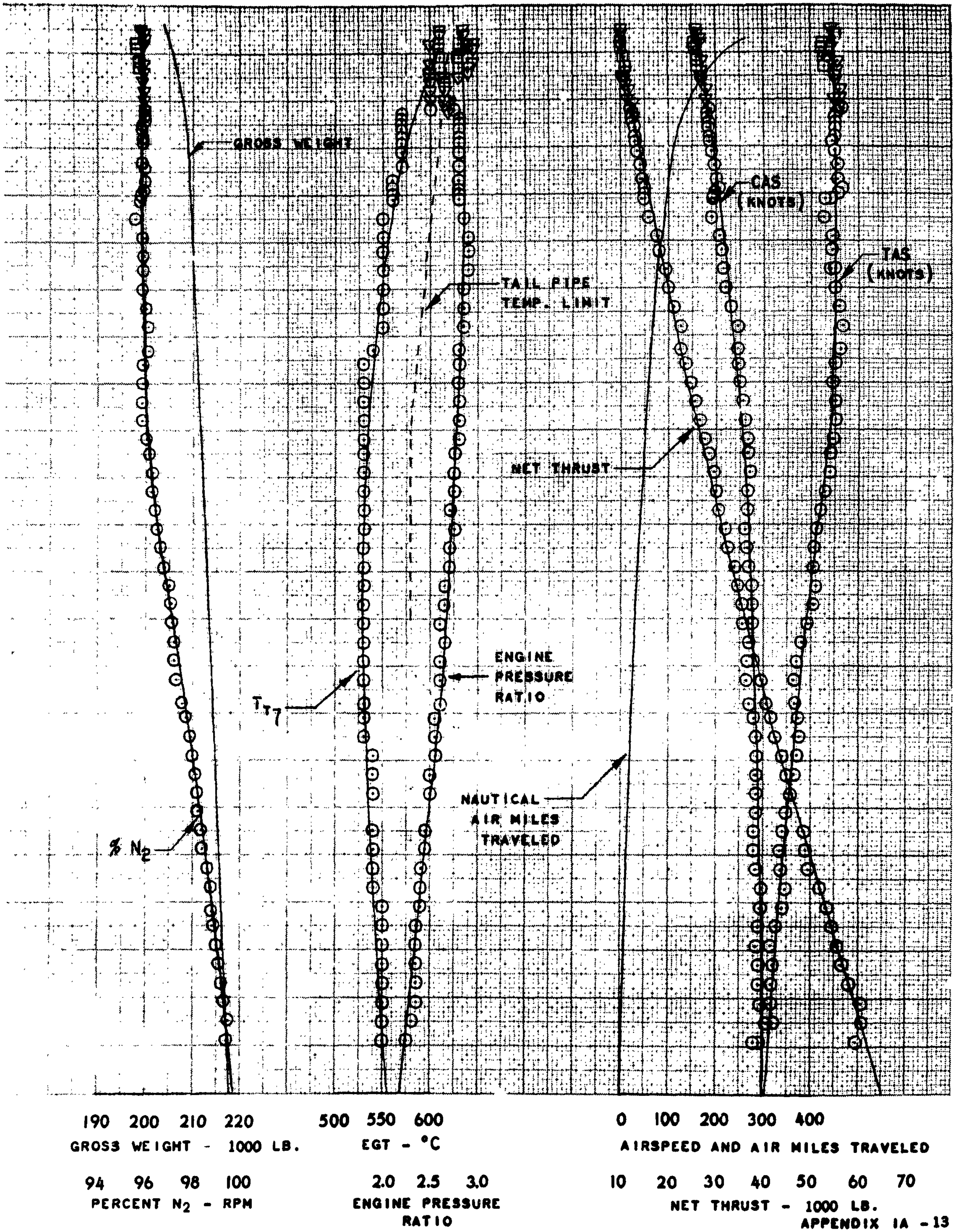


FIGURE NO. 8
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES; MILITARY RATED THRUST
NO EXTERNAL TANKS
TIME TO CLIMB
RATE OF CLIMB
FUEL USED
FUEL FLOW
NOTE: CONTRACTORS RECOMMENDED CLIMB SCHEDULE
ALTITUDE - 1000 FEET
0
5
10
15
20
25
30
35
40
45
50
55
0
1000
2000
3000
4000
5000
RATE OF CLIMB - FT/MIN
10
20
30
40
50
60
70
TOTAL FUEL FLOW - 1000 LB/HR
0
10
20
30
40
50
TIME TO CLIMB - MIN.
0
10
20
30
TOTAL FUEL USED - 1000 LB.


GROSS WEIGHT
TAIL PIPE TEMP. LIMIT
CAS (KNOTS)
TAS (KNOTS)
NET THRUST
ENGINE PRESSURE RATIO
T_{T7}
NAUTICAL AIR MILES TRAVELED
% N_2
190 200 210 220
GROSS WEIGHT - 1000 LB.
500 550 600
EGT - °C
0 100 200 300 400
AIRSPEED AND AIR MILES TRAVELED
94 96 98 100
PERCENT N_2 - RPM
2.0 2.5 3.0
ENGINE PRESSURE RATIO
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

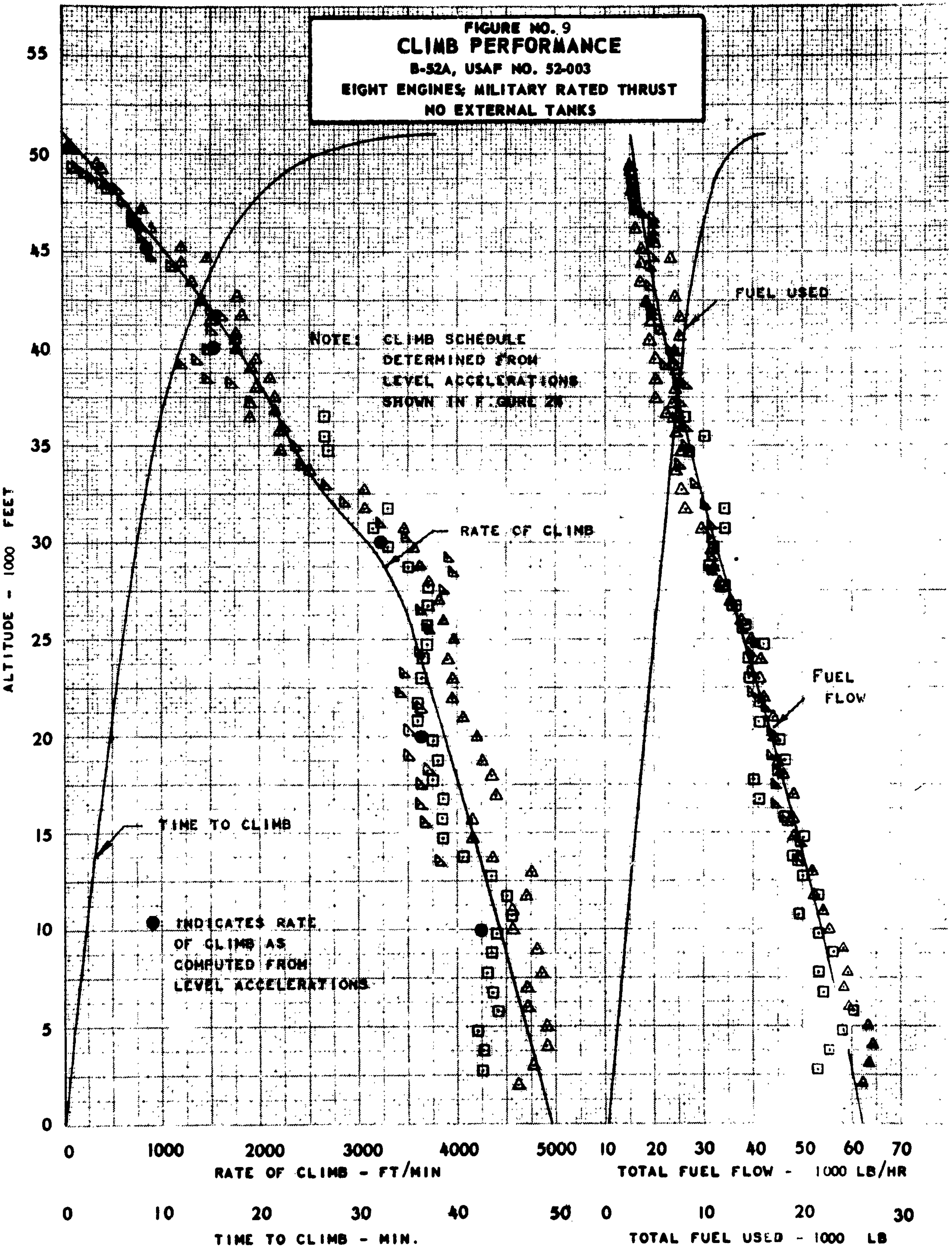
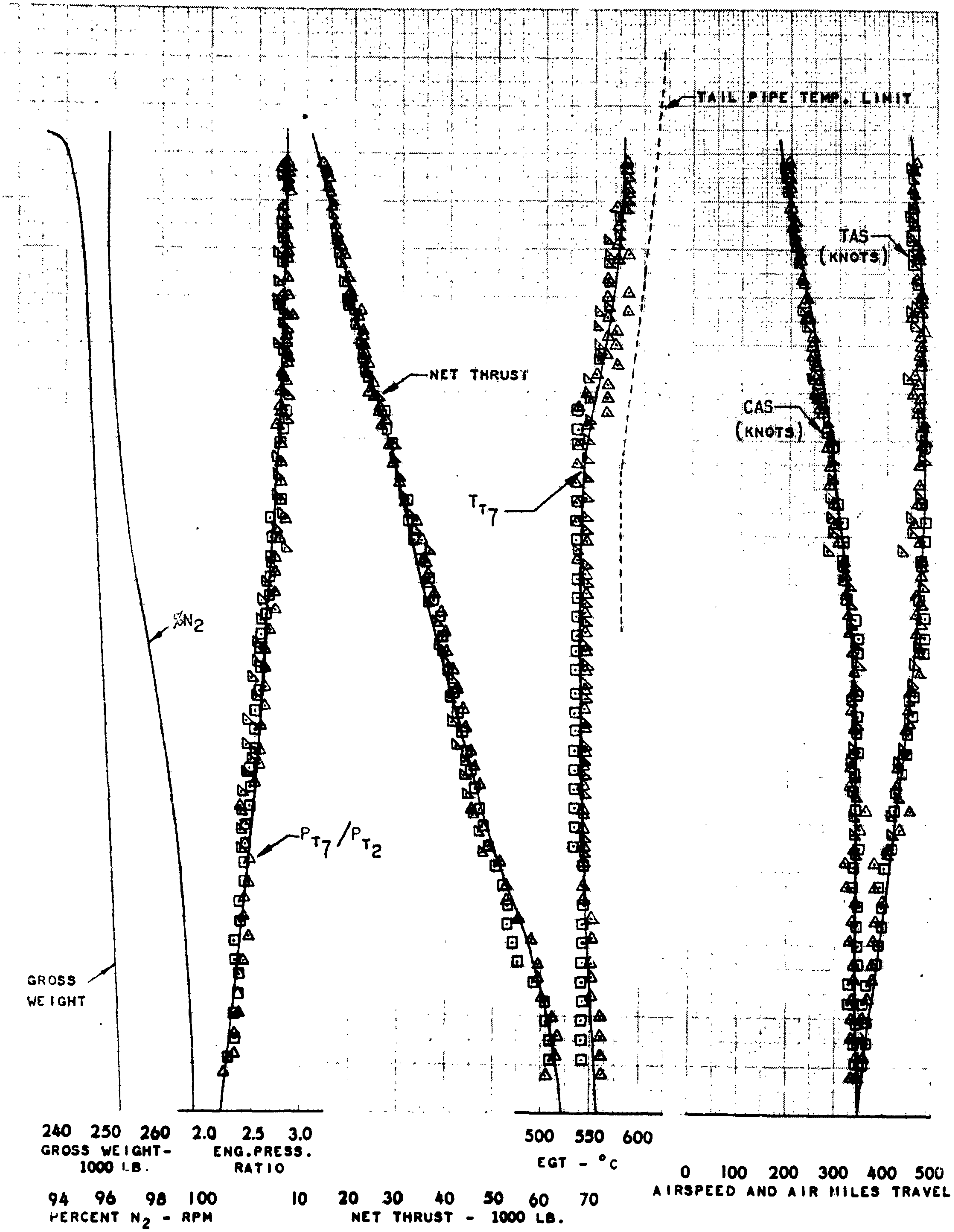


FIGURE NO. 9
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES; MILITARY RATED THRUST
NO EXTERNAL TANKS
NOTES: CLIMB SCHEDULE DETERMINED FROM LEVEL ACCELERATIONS SHOWN IN FIGURE 2H
RATE OF CLIMB
TIME TO CLIMB
FUEL USED
FUEL FLOW
INDICATES RATE OF CLIMB AS COMPUTED FROM LEVEL ACCELERATIONS
ALTITUDE - 1000 FEET
0
5
10
15
20
25
30
35
40
45
50
55
0
1000
2000
3000
4000
5000
RATE OF CLIMB - FT/MIN
10
20
30
40
50
60
70
TOTAL FUEL FLOW - 1000 LB/HR
0
10
20
30
40
50
TIME TO CLIMB - MIN.
0
10
20
30
TOTAL FUEL USED - 1000 LB


TAIL PIPE TEMP. LIMIT
NET THRUST
TAS
(KNOTS)
CAS
(KNOTS)
T_{T_7}
%N_2
P_{T_7}/P_{T_2}
GROSS
WEIGHT
240 250 260
GROSS WEIGHT-
1000 LB.
2.0 2.5 3.0
ENG. PRESS.
RATIO
500 550 600
EGT - °C
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVEL
94 96 98 100
PERCENT N_2 - RPM
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

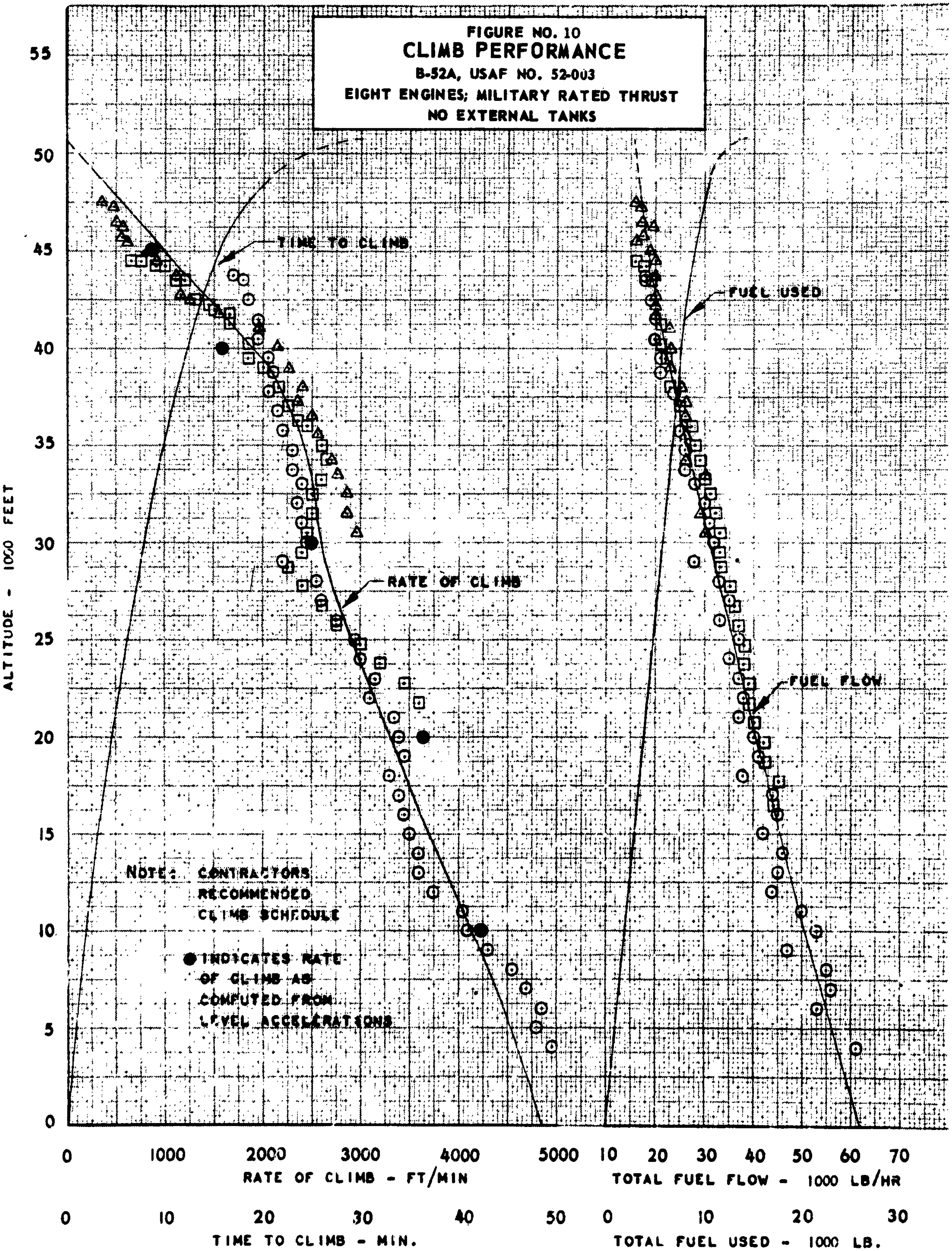
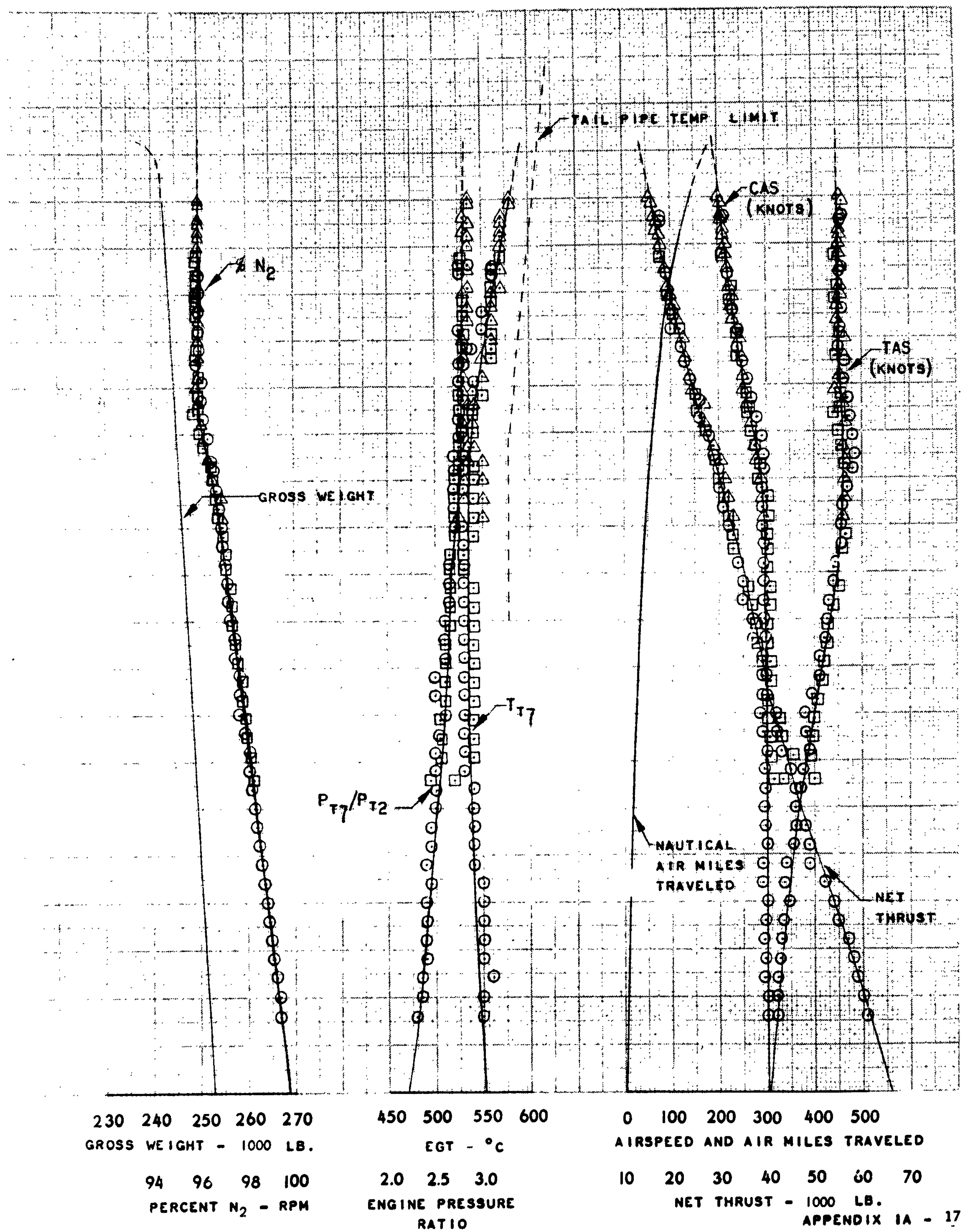


FIGURE NO. 10
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES; MILITARY RATED THRUST
NO EXTERNAL TANKS
TIME TO CLIMB
FUEL USED
RATE OF CLIMB
FUEL FLOW
NOTE: CONTRACTORS RECOMMENDED CLIMB SCHEDULE
● INDICATES RATE OF CLIMB AS COMPUTED FROM LEVEL ACCELERATIONS
ALTITUDE - 1000 FEET
0
5
10
15
20
25
30
35
40
45
50
55
0 1000 2000 3000 4000 5000
RATE OF CLIMB - FT/MIN
10 20 30 40 50 60 70
TOTAL FUEL FLOW - 1000 LB/HR
0 10 20 30 40 50
TIME TO CLIMB - MIN.
0 10 20 30
TOTAL FUEL USED - 1000 LB.


TAIL PIPE TEMP LIMIT
% N2
CAS (KNOTS)
TAS (KNOTS)
GROSS WEIGHT
T_{T7}
P_{T7}/P_{T2}
NAUTICAL AIR MILES TRAVELED
NET THRUST
230 240 250 260 270
GROSS WEIGHT - 1000 LB.
94 96 98 100
PERCENT N_2 - RPM
450 500 550 600
EGT - °C
2.0 2.5 3.0
ENGINE PRESSURE RATIO
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

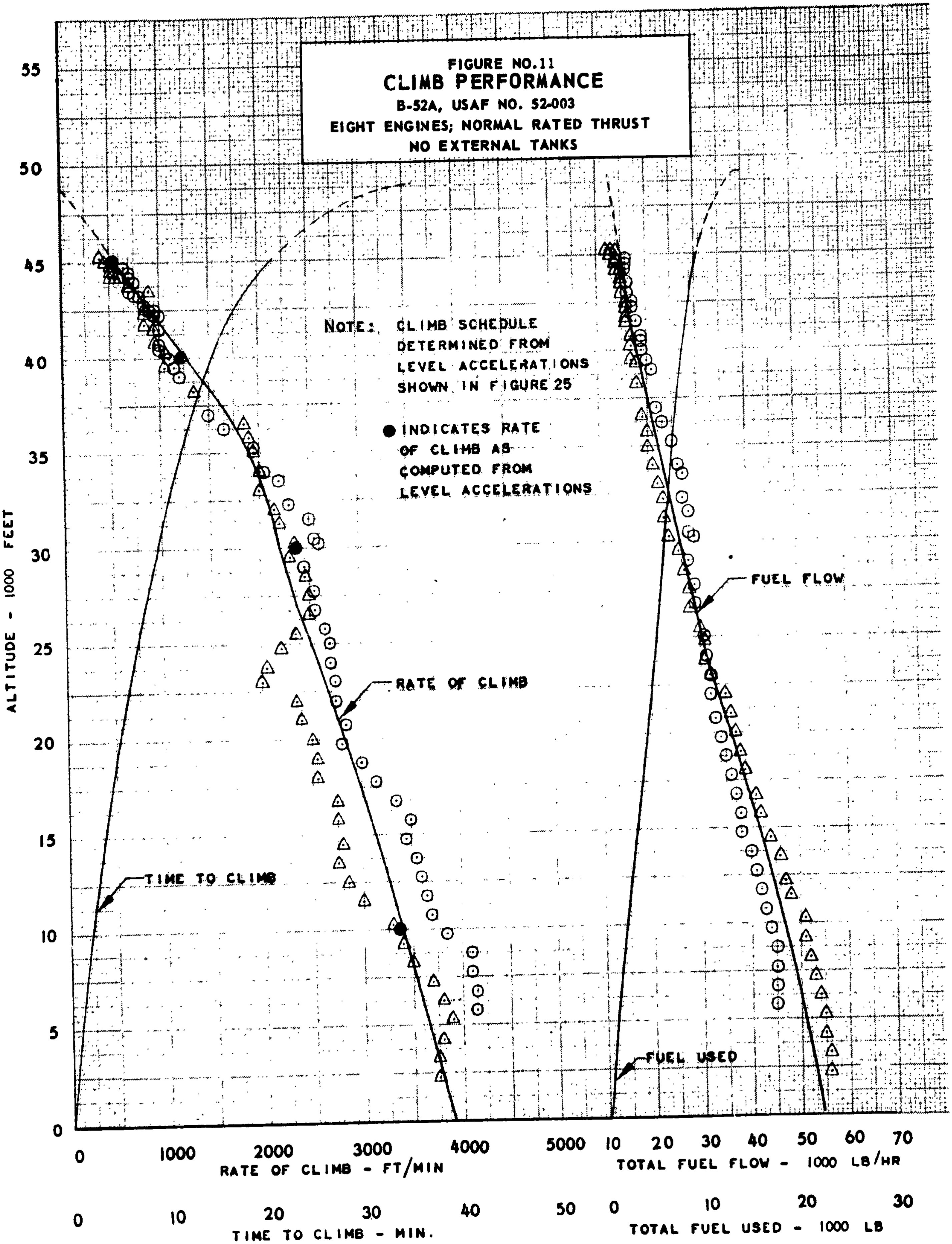
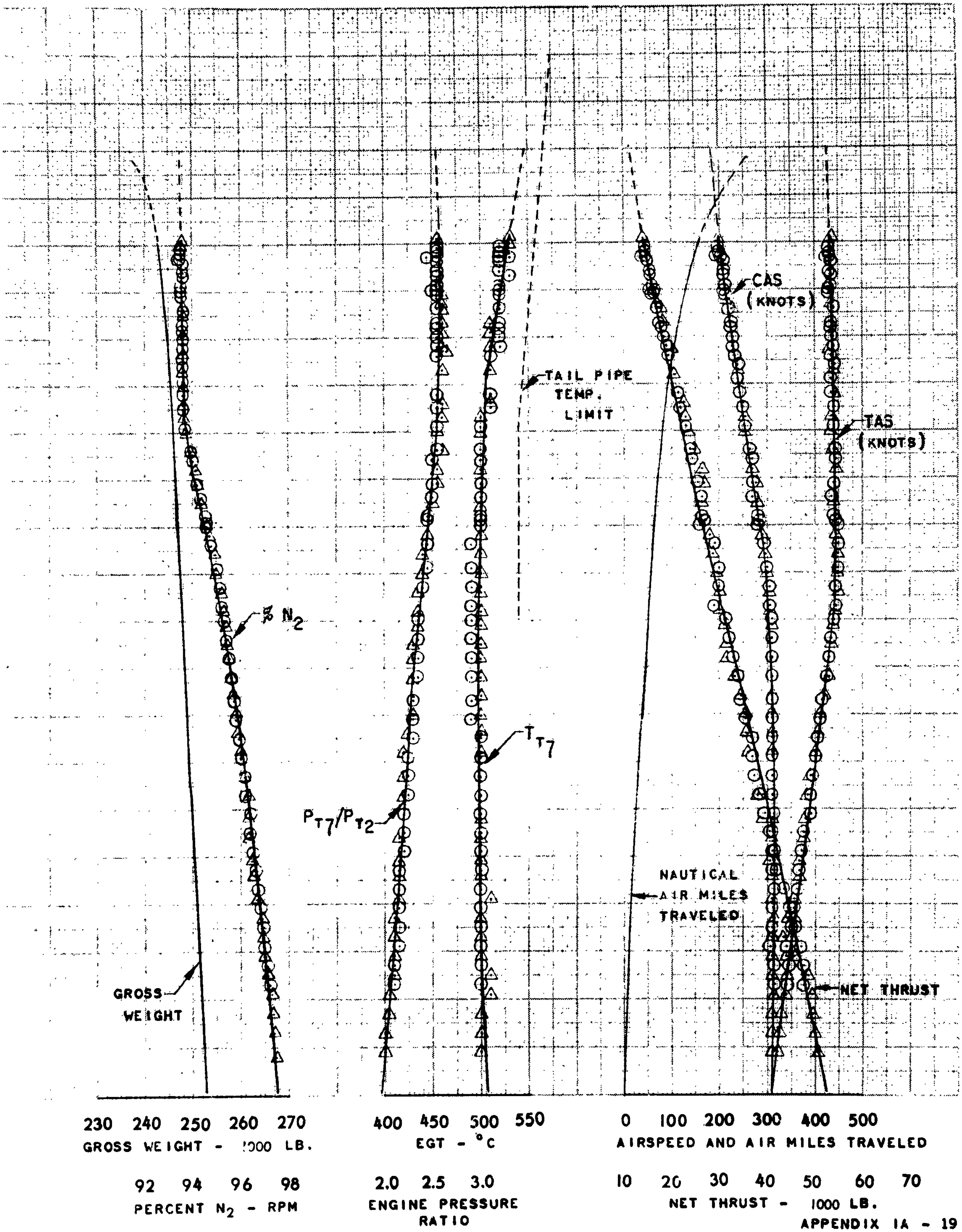


FIGURE NO.11
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES; NORMAL RATED THRUST
NO EXTERNAL TANKS
NOTE: CLIMB SCHEDULE DETERMINED FROM LEVEL ACCELERATIONS SHOWN IN FIGURE 25
● INDICATES RATE OF CLIMB AS COMPUTED FROM LEVEL ACCELERATIONS
TIME TO CLIMB
RATE OF CLIMB
FUEL FLOW
FUEL USED
ALTITUDE - 1000 FEET
0
5
10
15
20
25
30
35
40
45
50
55
0
1000
2000
3000
4000
5000
RATE OF CLIMB - FT/MIN
0
10
20
30
40
50
TIME TO CLIMB - MIN.
10
20
30
40
50
60
70
TOTAL FUEL FLOW - 1000 LB/HR
0
10
20
30
TOTAL FUEL USED - 1000 LB


CAS (KNOTS)
TAIL PIPE TEMP. LIMIT
TAS (KNOTS)
% N2
TT7
PT7/PT2
NAUTICAL AIR MILES TRAVELED
NET THRUST
GROSS WEIGHT
230 240 250 260 270
GROSS WEIGHT - 1000 LB.
400 450 500 550
EGT - °C
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
92 94 96 98
PERCENT N2 - RPM
2.0 2.5 3.0
ENGINE PRESSURE RATIO
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

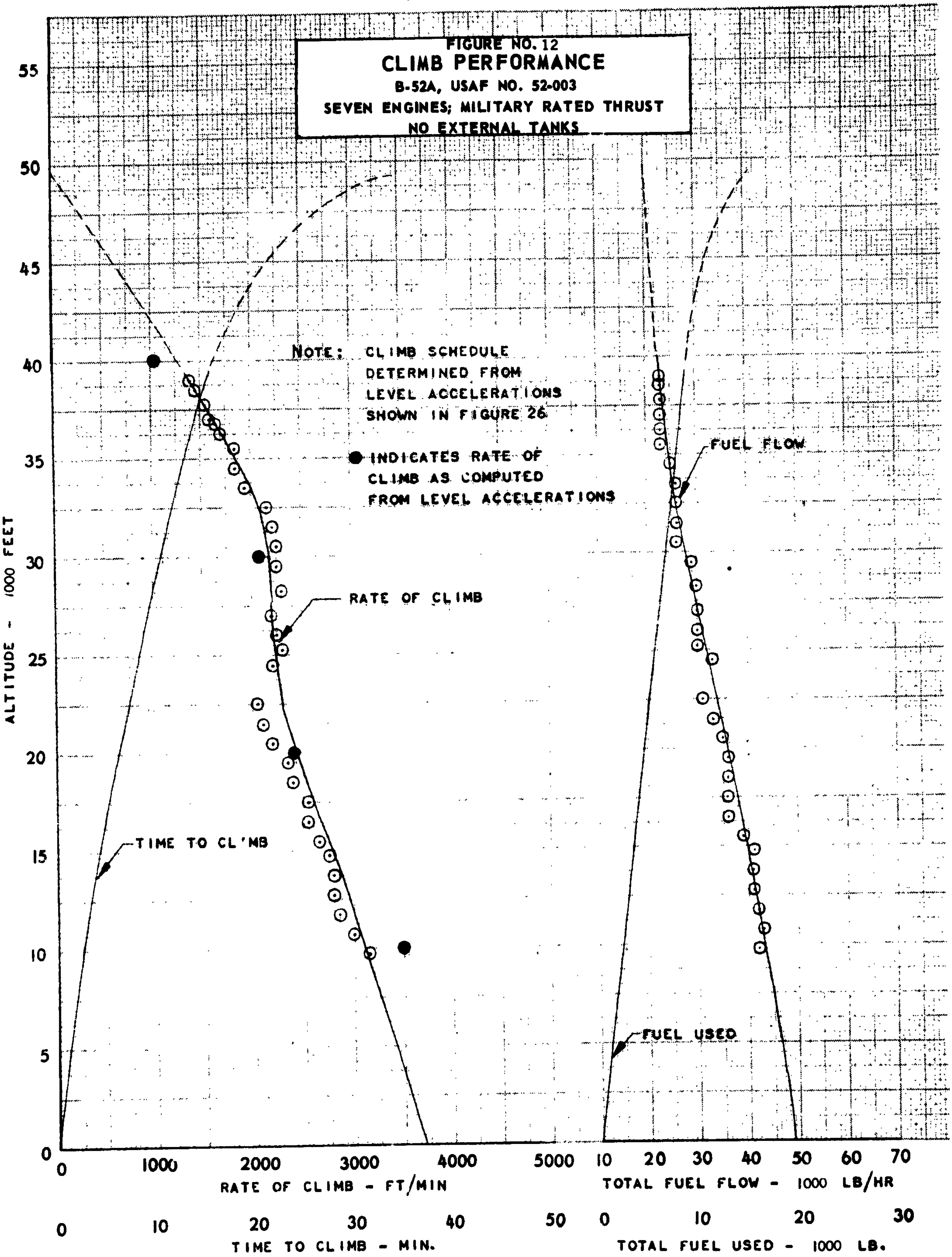
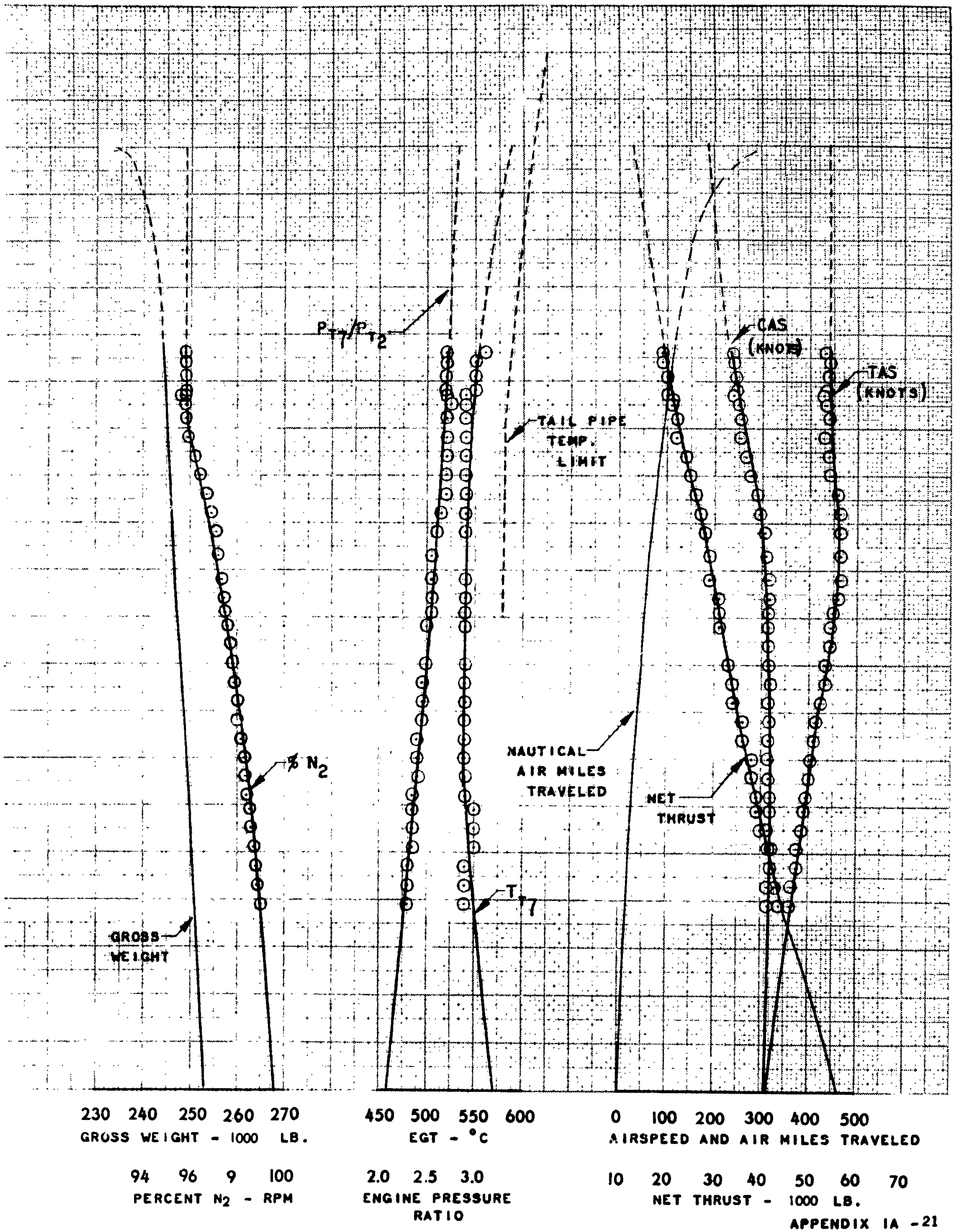


FIGURE NO. 12
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
SEVEN ENGINES; MILITARY RATED THRUST
NO EXTERNAL TANKS
NOTE: CLIMB SCHEDULE DETERMINED FROM LEVEL ACCELERATIONS SHOWN IN FIGURE 26
● INDICATES RATE OF CLIMB AS COMPUTED FROM LEVEL ACCELERATIONS
RATE OF CLIMB
TIME TO CLIMB
FUEL FLOW
FUEL USED
ALTITUDE - 1000 FEET
0
5
10
15
20
25
30
35
40
45
50
55
RATE OF CLIMB - FT/MIN
0
1000
2000
3000
4000
5000
TIME TO CLIMB - MIN.
0
10
20
30
40
50
TOTAL FUEL FLOW - 1000 LB/HR
10
20
30
40
50
60
70
TOTAL FUEL USED - 1000 LB.
0
10
20
30



P_{T7}/P_{T2}
TAIL PIPE TEMP. LIMIT
CAS (KNOTS)
TAS (KNOTS)
% N_2
NAUTICAL AIR MILES TRAVELED
NET THRUST
T_{T7}
GROSS WEIGHT
230 240 250 260 270
GROSS WEIGHT - 1000 LB.
94 96 9 100
PERCENT N_2 - RPM
450 500 550 600
EGT - °C
2.0 2.5 3.0
ENGINE PRESSURE RATIO
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

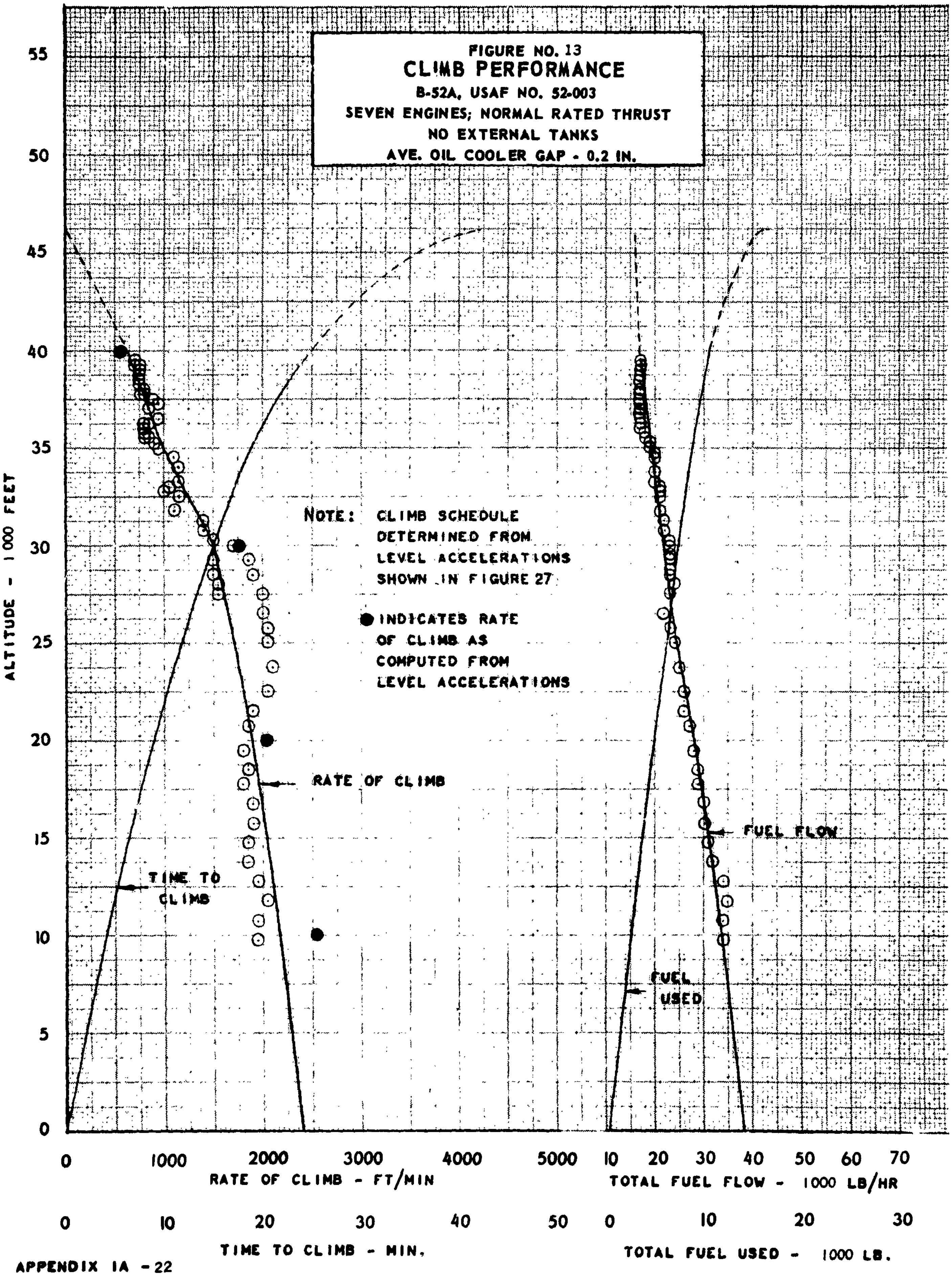
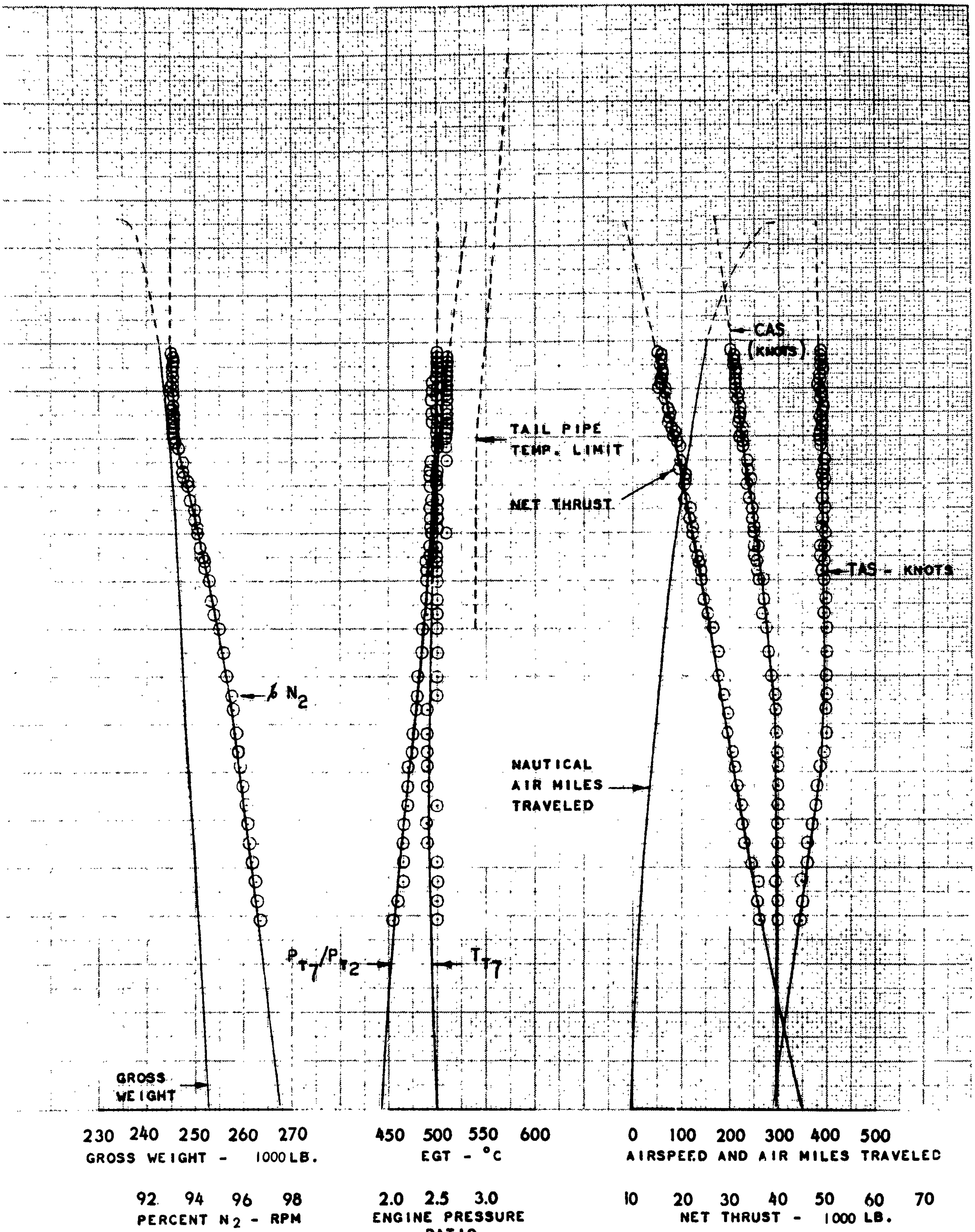


FIGURE NO. 13
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
SEVEN ENGINES; NORMAL RATED THRUST
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
NOTE: CLIMB SCHEDULE DETERMINED FROM LEVEL ACCELERATIONS SHOWN IN FIGURE 27
● INDICATES RATE OF CLIMB AS COMPUTED FROM LEVEL ACCELERATIONS
RATE OF CLIMB
TIME TO CLIMB
FUEL FLOW
FUEL USED
ALTITUDE - 1000 FEET
0
5
10
15
20
25
30
35
40
45
50
55
0 1000 2000 3000 4000 5000
RATE OF CLIMB - FT/MIN
10 20 30 40 50 60 70
TOTAL FUEL FLOW - 1000 LB/HR
0 10 20 30 40 50
TIME TO CLIMB - MIN.
0 10 20 30
TOTAL FUEL USED - 1000 LB.


CAS (KNOTS)
TAIL PIPE TEMP. LIMIT
NET THRUST
TAS - KNOTS
% N2
NAUTICAL AIR MILES TRAVELED
PT7/PT2
TT7
GROSS WEIGHT
230 240 250 260 270
GROSS WEIGHT - 1000 LB.
450 500 550 600
EGT - °C
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
92 94 96 98
PERCENT N2 - RPM
2.0 2.5 3.0
ENGINE PRESSURE RATIO
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

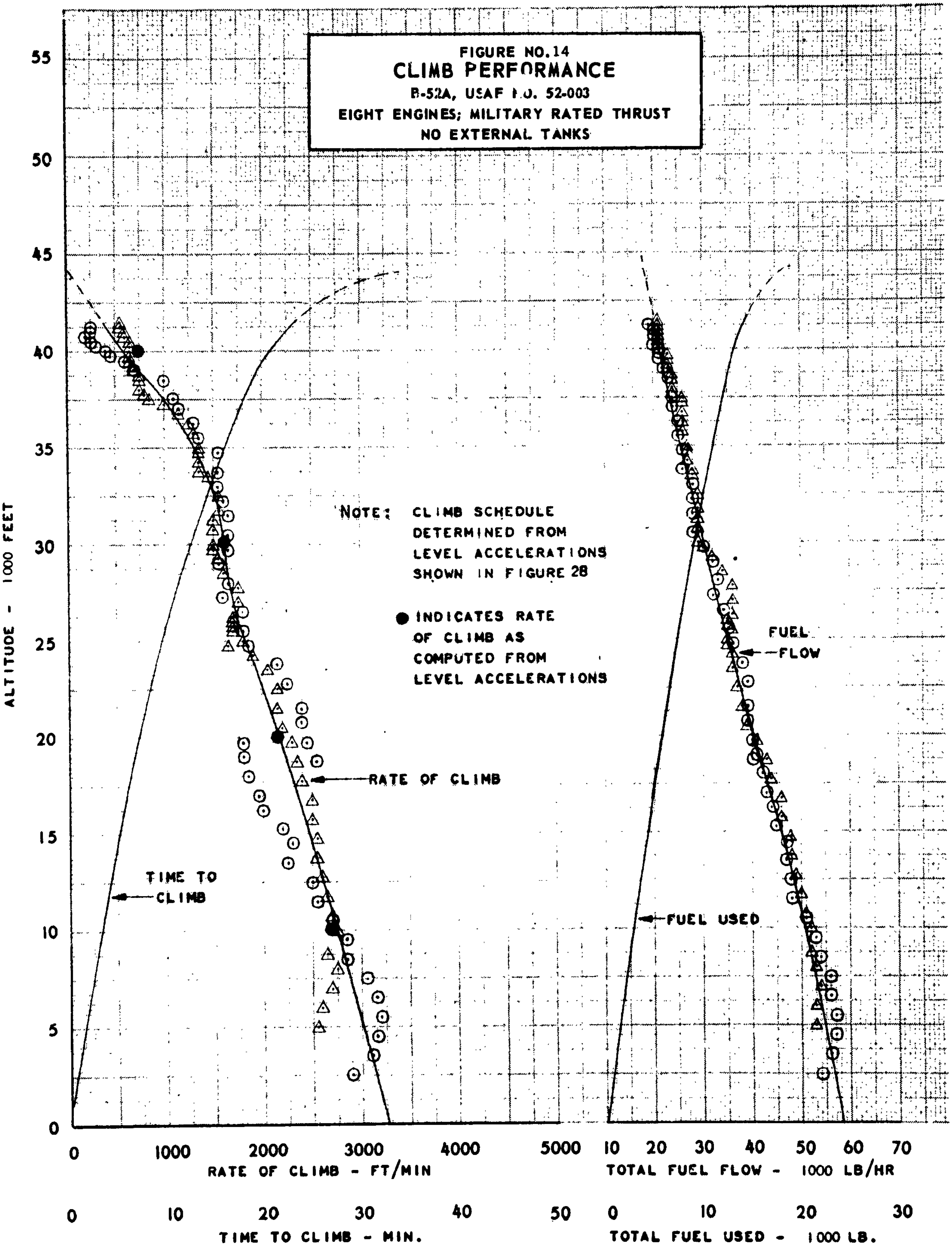
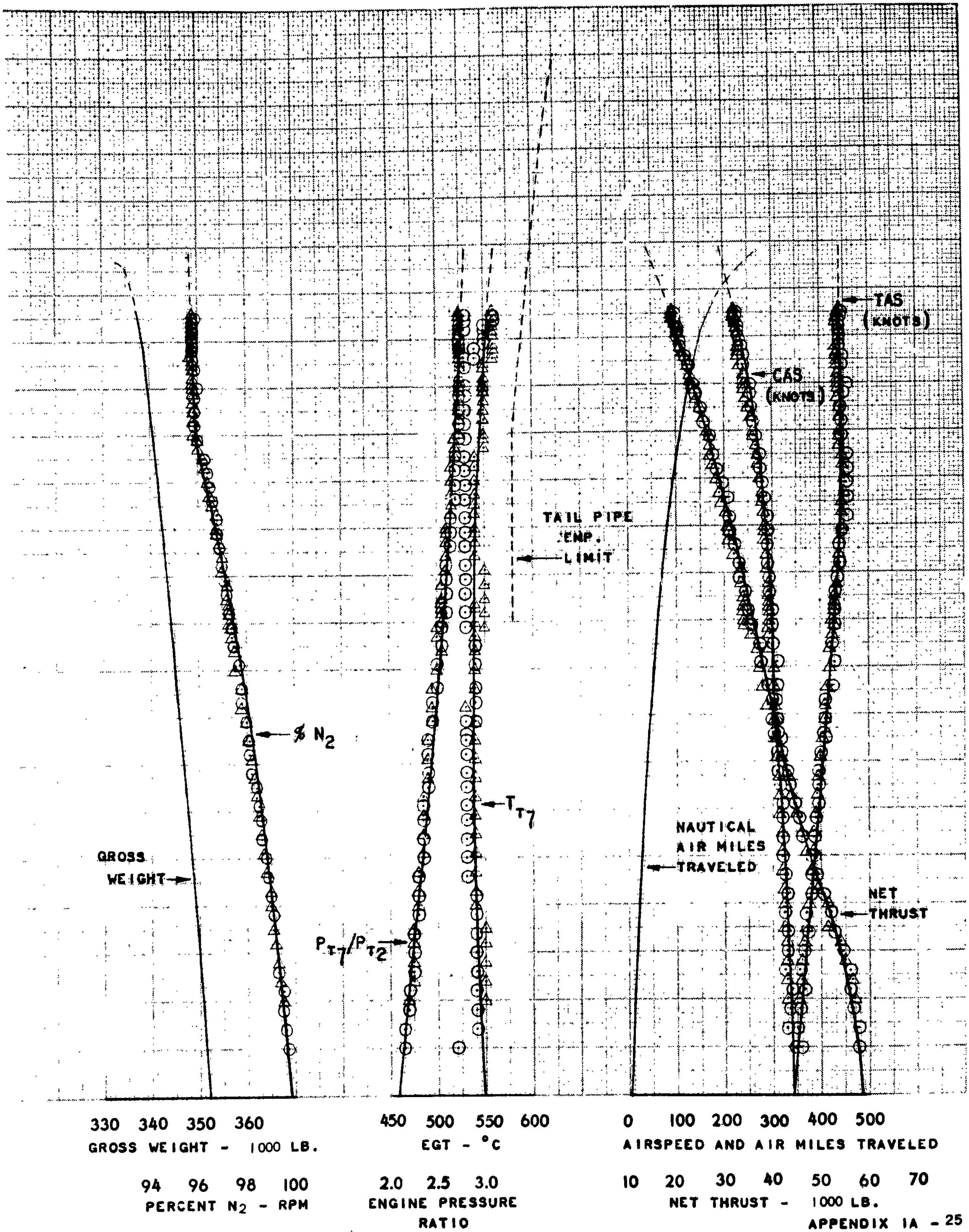


FIGURE NO. 14
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES; MILITARY RATED THRUST
NO EXTERNAL TANKS
NOTE: CLIMB SCHEDULE DETERMINED FROM LEVEL ACCELERATIONS SHOWN IN FIGURE 28
● INDICATES RATE OF CLIMB AS COMPUTED FROM LEVEL ACCELERATIONS
ALTITUDE - 1000 FEET
55
50
45
40
35
30
25
20
15
10
5
0
TIME TO CLIMB
RATE OF CLIMB
FUEL FLOW
FUEL USED
0
1000
2000
3000
4000
5000
RATE OF CLIMB - FT/MIN
10
20
30
40
50
60
70
TOTAL FUEL FLOW - 1000 LB/HR
0
10
20
30
40
50
TIME TO CLIMB - MIN.
0
10
20
30
TOTAL FUEL USED - 1000 LB.


TAS (KNOTS)
CAS (KNOTS)
TAIL PIPE TEMP. LIMIT
% N_2
T_{T7}
NAUTICAL AIR MILES TRAVELED
GROSS WEIGHT
NET THRUST
P_{T7}/P_{T2}
330 340 350 360
GROSS WEIGHT - 1000 LB.
450 500 550 600
EGT - °C
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
94 96 98 100
PERCENT N_2 - RPM
2.0 2.5 3.0
ENGINE PRESSURE RATIO
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

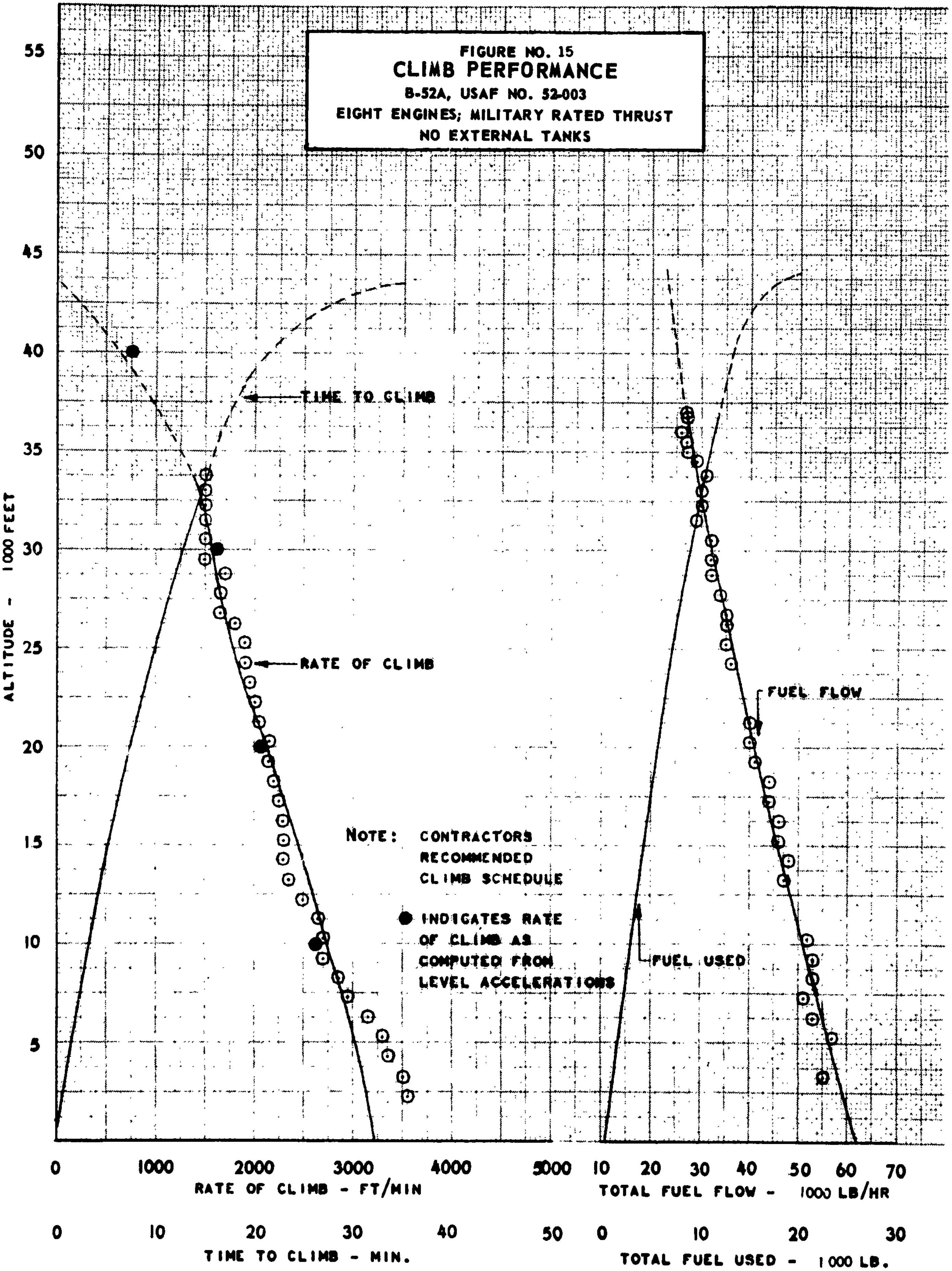
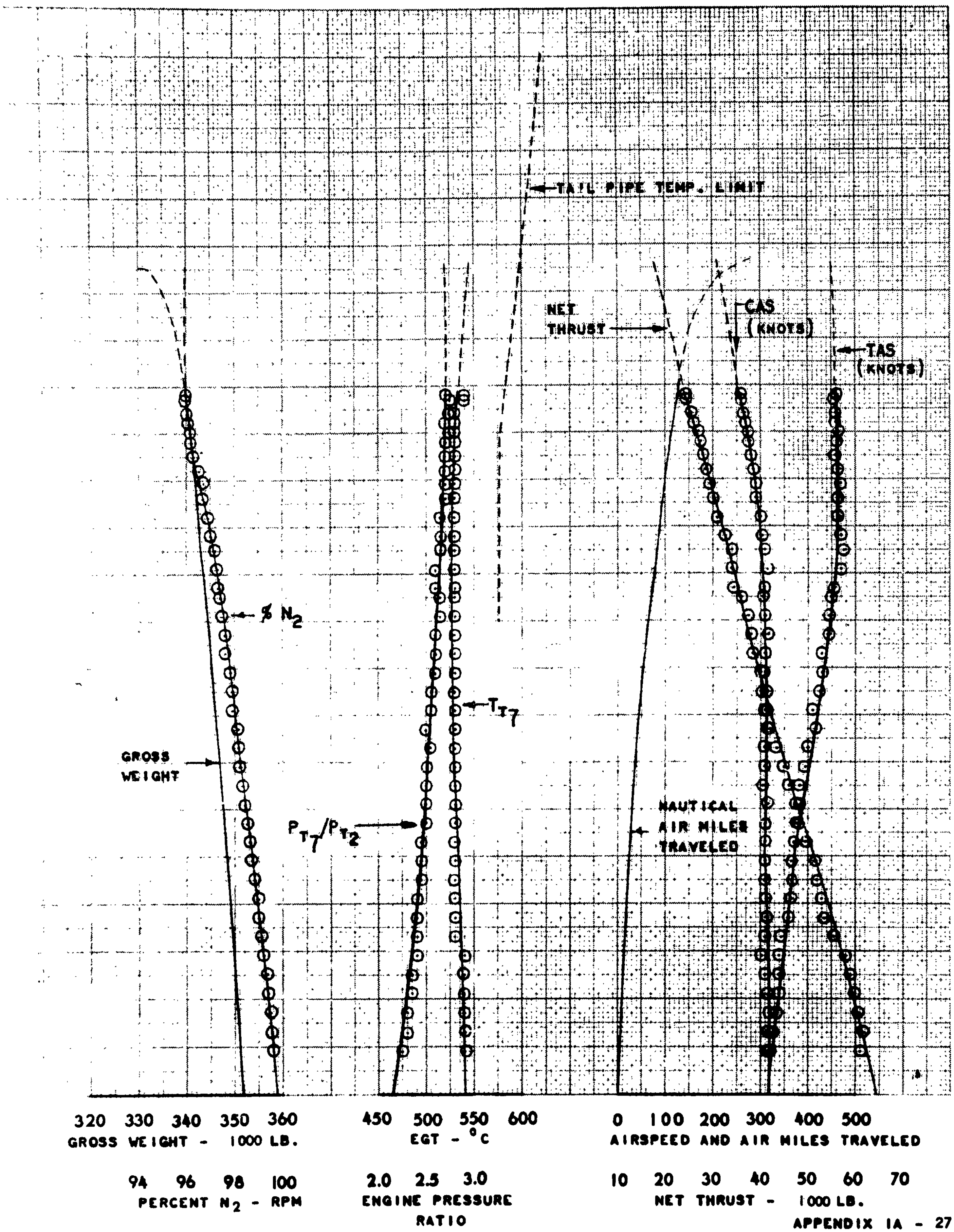


FIGURE NO. 15
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES; MILITARY RATED THRUST
NO EXTERNAL TANKS
ALTITUDE - 1000 FEET
55
50
45
40
35
30
25
20
15
10
5
TIME TO CLIMB
RATE OF CLIMB
FUEL FLOW
FUEL USED
NOTE: CONTRACTORS RECOMMENDED CLIMB SCHEDULE
INDICATES RATE OF CLIMB AS COMPUTED FROM LEVEL ACCELERATIONS
0 1000 2000 3000 4000 5000
RATE OF CLIMB - FT/MIN
0 10 20 30 40 50
TIME TO CLIMB - MIN.
10 20 30 40 50 60 70
TOTAL FUEL FLOW - 1000 LB/HR
0 10 20 30
TOTAL FUEL USED - 1000 LB.


TAIL PIPE TEMP. LIMIT
NET THRUST
CAS (KNOTS)
TAS (KNOTS)
% N_2
T_{T7}
GROSS WEIGHT
P_{T7}/P_{T2}
NAUTICAL AIR MILES TRAVELED
320 330 340 350 360
GROSS WEIGHT - 1000 LB.
94 96 98 100
PERCENT N_2 - RPM
450 500 550 600
EGT - °C
2.0 2.5 3.0
ENGINE PRESSURE RATIO
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

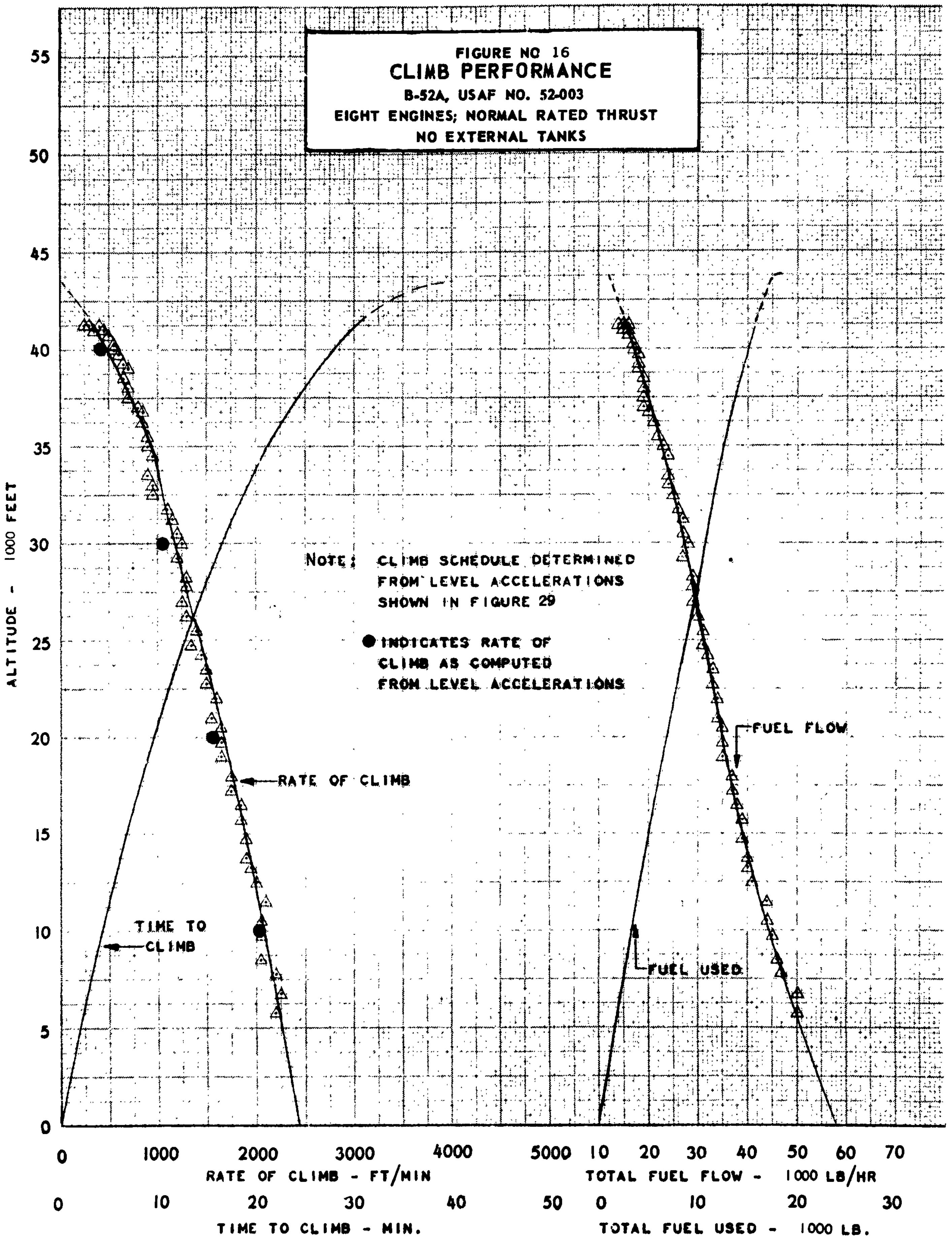
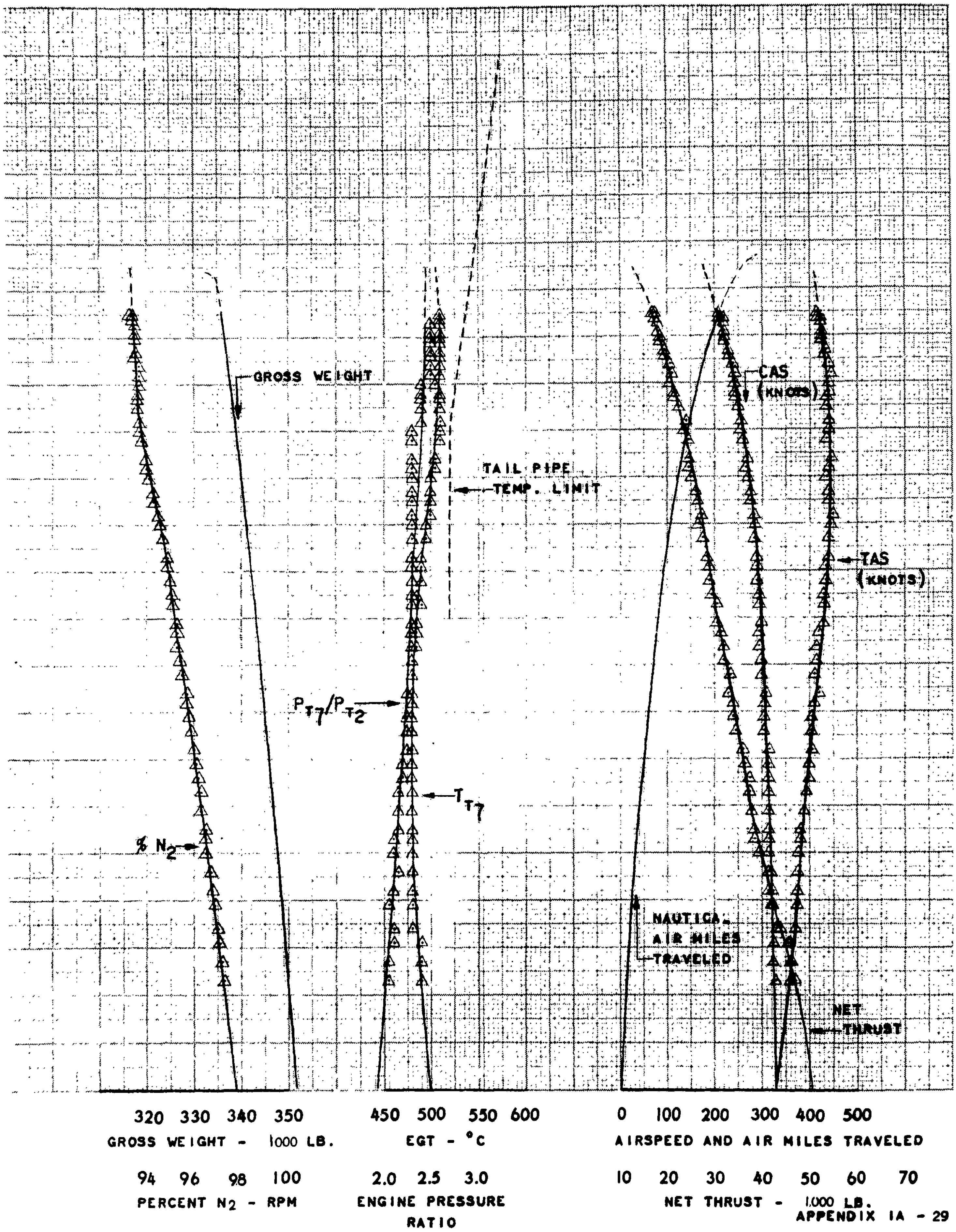


FIGURE NO 16
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES; NORMAL RATED THRUST
NO EXTERNAL TANKS
NOTE: CLIMB SCHEDULE DETERMINED FROM LEVEL ACCELERATIONS SHOWN IN FIGURE 29
● INDICATES RATE OF CLIMB AS COMPUTED FROM LEVEL ACCELERATIONS
RATE OF CLIMB
TIME TO CLIMB
FUEL FLOW
FUEL USED
ALTITUDE - 1000 FEET
0
5
10
15
20
25
30
35
40
45
50
55
0
1000
2000
3000
4000
5000
RATE OF CLIMB - FT/MIN
0
10
20
30
40
50
TIME TO CLIMB - MIN.
10
20
30
40
50
60
70
TOTAL FUEL FLOW - 1000 LB/HR
0
10
20
30
TOTAL FUEL USED - 1000 LB.


GROSS WEIGHT
TAIL PIPE
TEMP. LIMIT
CAS
(KNOTS)
TAS
(KNOTS)
P_{T7}/P_{T2}
T_{T7}
% N_2
NAUTICAL
AIR MILES
TRAVELED
NET
THRUST
320 330 340 350
GROSS WEIGHT - 1000 LB.
450 500 550 600
EGT - °C
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
94 96 98 100
PERCENT N_2 - RPM
2.0 2.5 3.0
ENGINE PRESSURE
RATIO
10 20 30 40 50 60 70
NET THRUST - 1,000 LB.

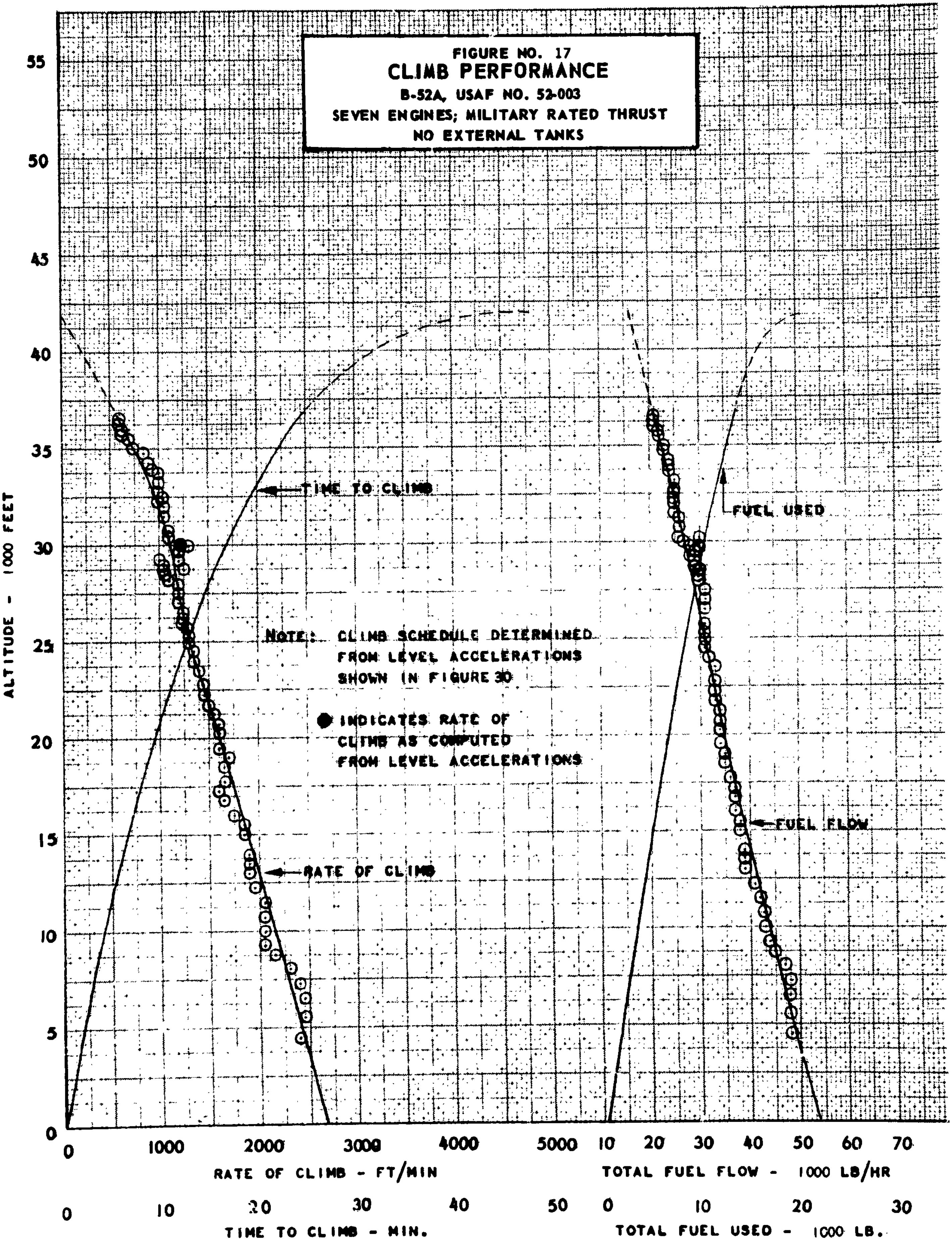
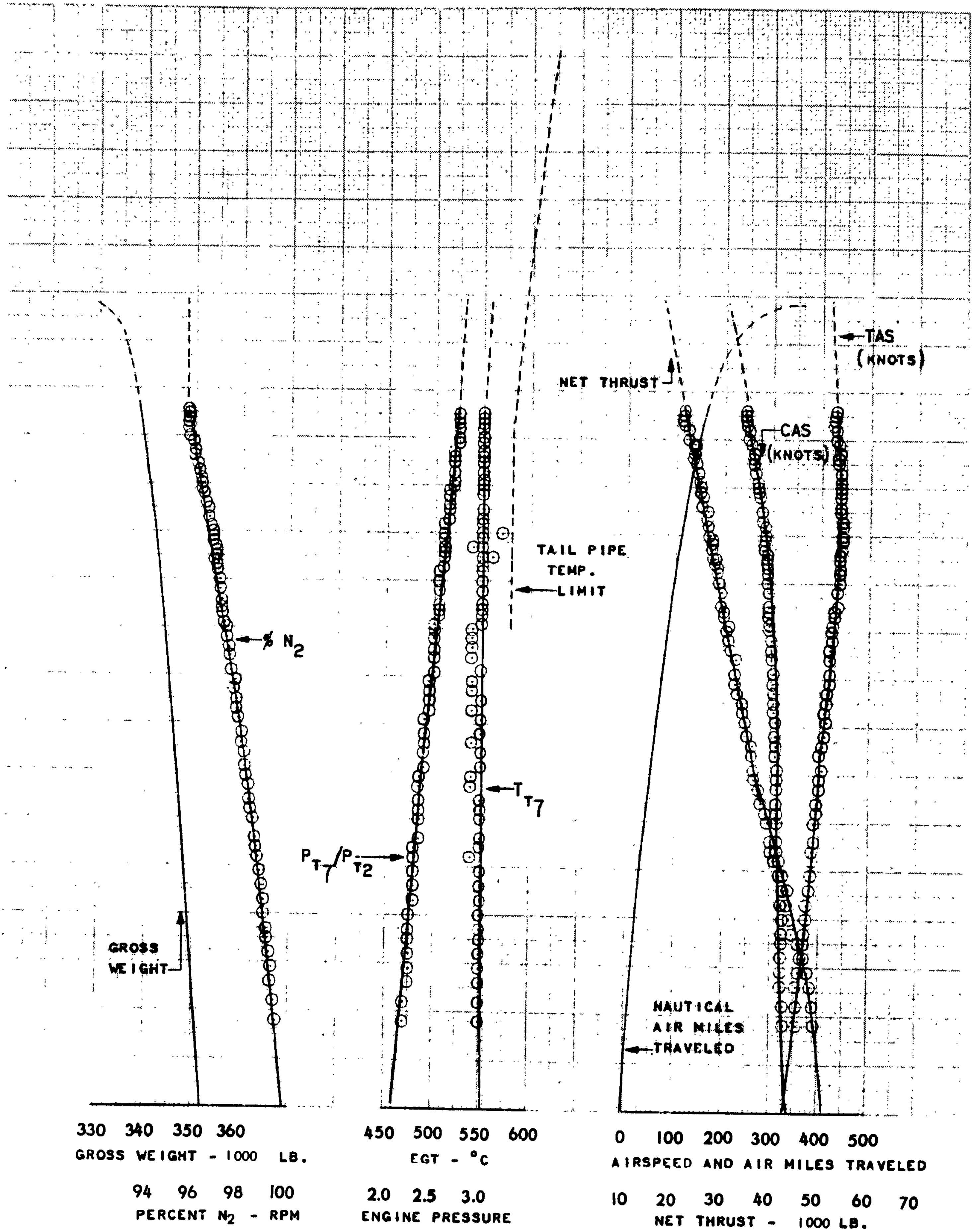


FIGURE NO. 17
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
SEVEN ENGINES; MILITARY RATED THRUST
NO EXTERNAL TANKS
TIME TO CLIMB
FUEL USED
NOTE: CLIMB SCHEDULE DETERMINED FROM LEVEL ACCELERATIONS SHOWN IN FIGURE 30
● INDICATES RATE OF CLIMB AS COMPUTED FROM LEVEL ACCELERATIONS
FUEL FLOW
RATE OF CLIMB
ALTITUDE - 1000 FEET
0
5
10
15
20
25
30
35
40
45
50
55
0
1000
2000
3000
4000
5000
RATE OF CLIMB - FT/MIN
10
20
30
40
50
60
70
TOTAL FUEL FLOW - 1000 LB/HR
0
10
20
30
40
50
TIME TO CLIMB - MIN.
0
10
20
30
TOTAL FUEL USED - 1000 LB.


TAS (KNOTS)
NET THRUST
CAS (KNOTS)
TAIL PIPE TEMP. LIMIT
% N_2
T_{T7}
P_{T7}/P_{T2}
GROSS WEIGHT
NAUTICAL AIR MILES TRAVELED
330 340 350 360
GROSS WEIGHT - 1000 LB.
94 96 98 100
PERCENT N_2 - RPM
450 500 550 600
EGT - °C
2.0 2.5 3.0
ENGINE PRESSURE RATIO
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

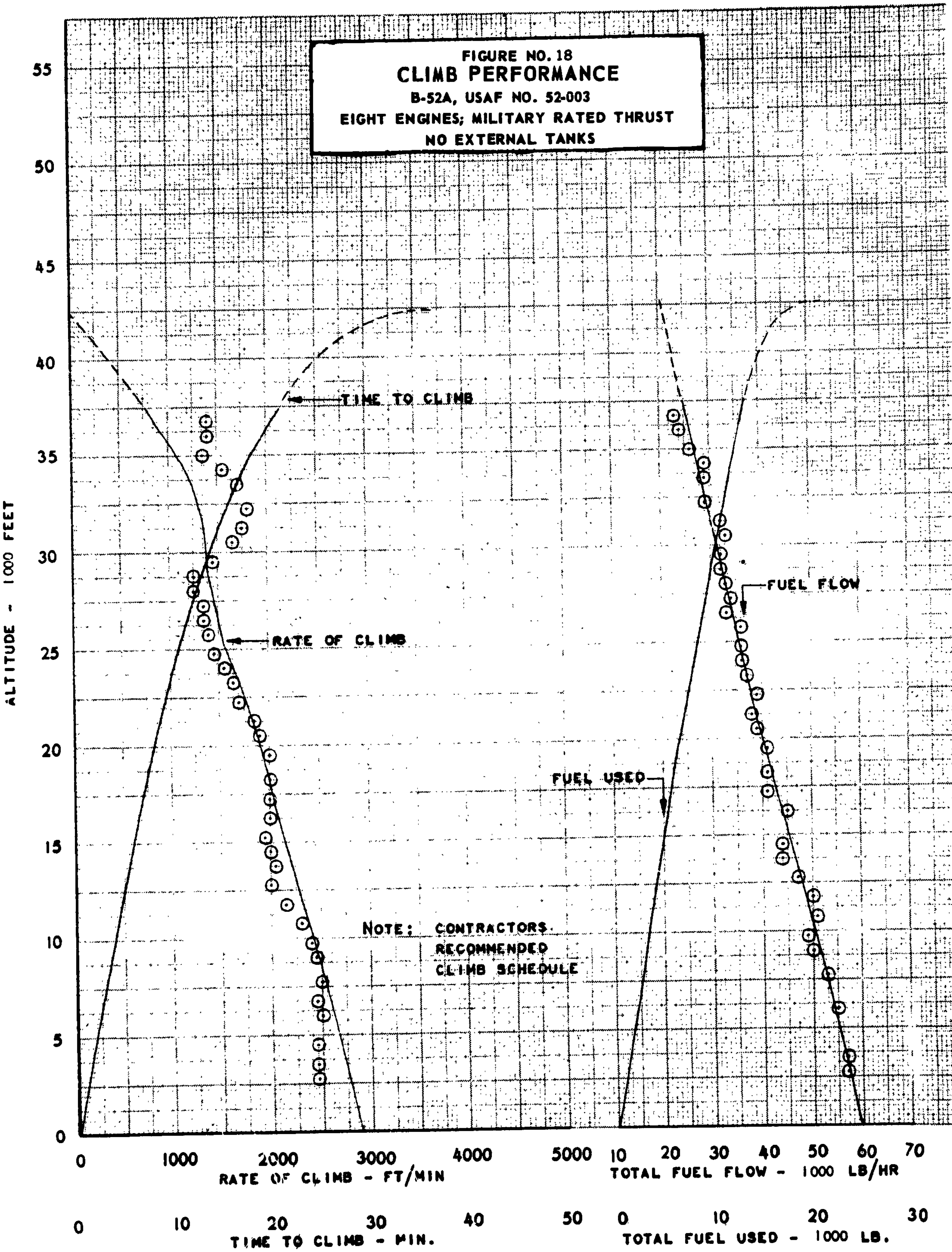
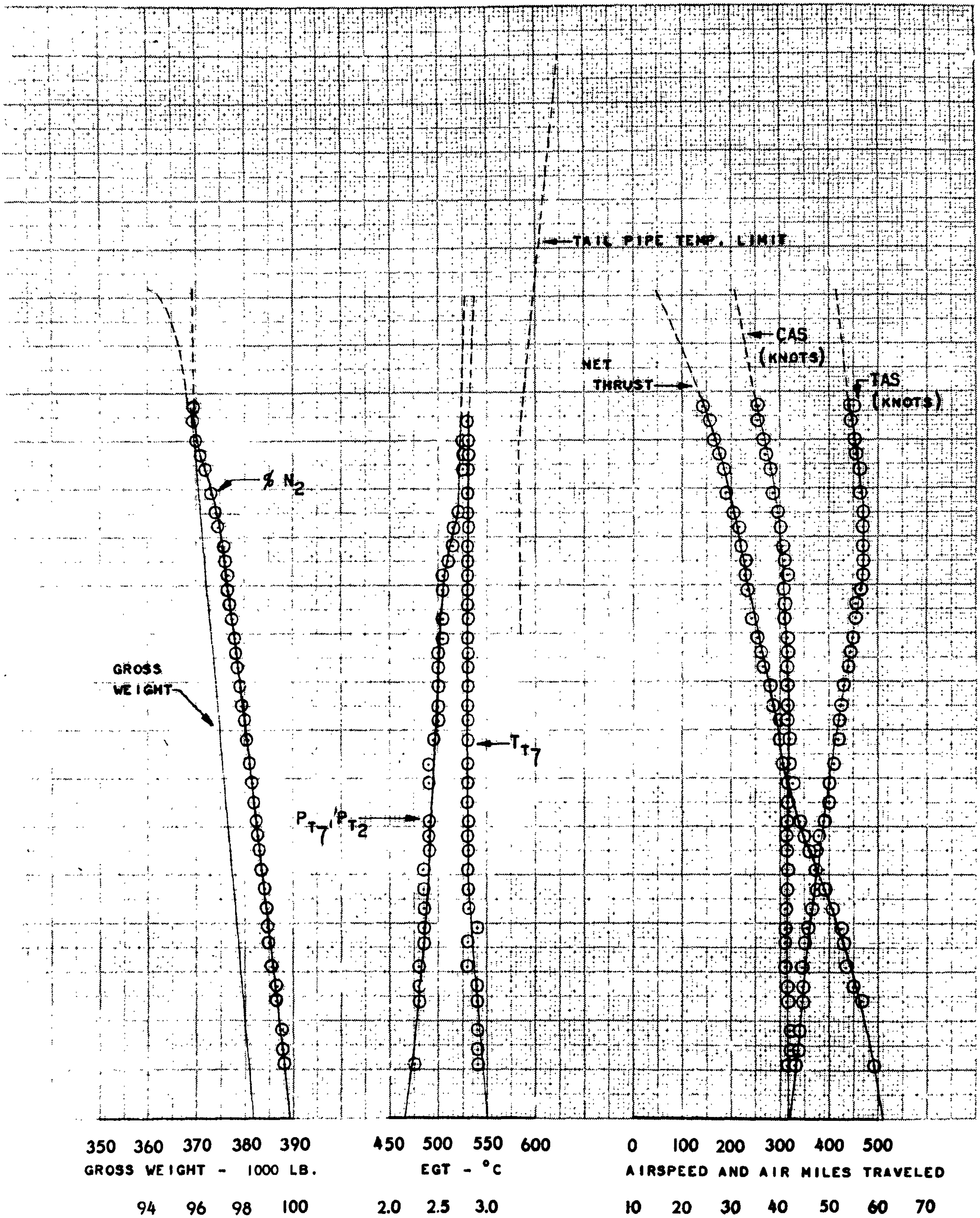


FIGURE NO. 18
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES; MILITARY RATED THRUST
NO EXTERNAL TANKS
TIME TO CLIMB
RATE OF CLIMB
FUEL FLOW
FUEL USED
NOTE: CONTRACTORS RECOMMENDED CLIMB SCHEDULE
ALTITUDE - 1000 FEET
0 5 10 15 20 25 30 35 40 45 50 55
0 1000 2000 3000 4000 5000
RATE OF CLIMB - FT/MIN
0 10 20 30 40 50
TIME TO CLIMB - MIN.
10 20 30 40 50 60 70
TOTAL FUEL FLOW - 1000 LB/HR
0 10 20 30
TOTAL FUEL USED - 1000 LB.


TAIL PIPE TEMP. LIMIT
CAS (KNOTS)
NET THRUST
TAS (KNOTS)
% N_2
GROSS WEIGHT
T_{T_7}
P_{T_7}/P_{T_2}
350 360 370 380 390
GROSS WEIGHT - 1000 LB.
94 96 98 100
PERCENT N_2 - RPM
450 500 550 600
EGT - °C
2.0 2.5 3.0
ENGINE PRESSURE RATIO
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

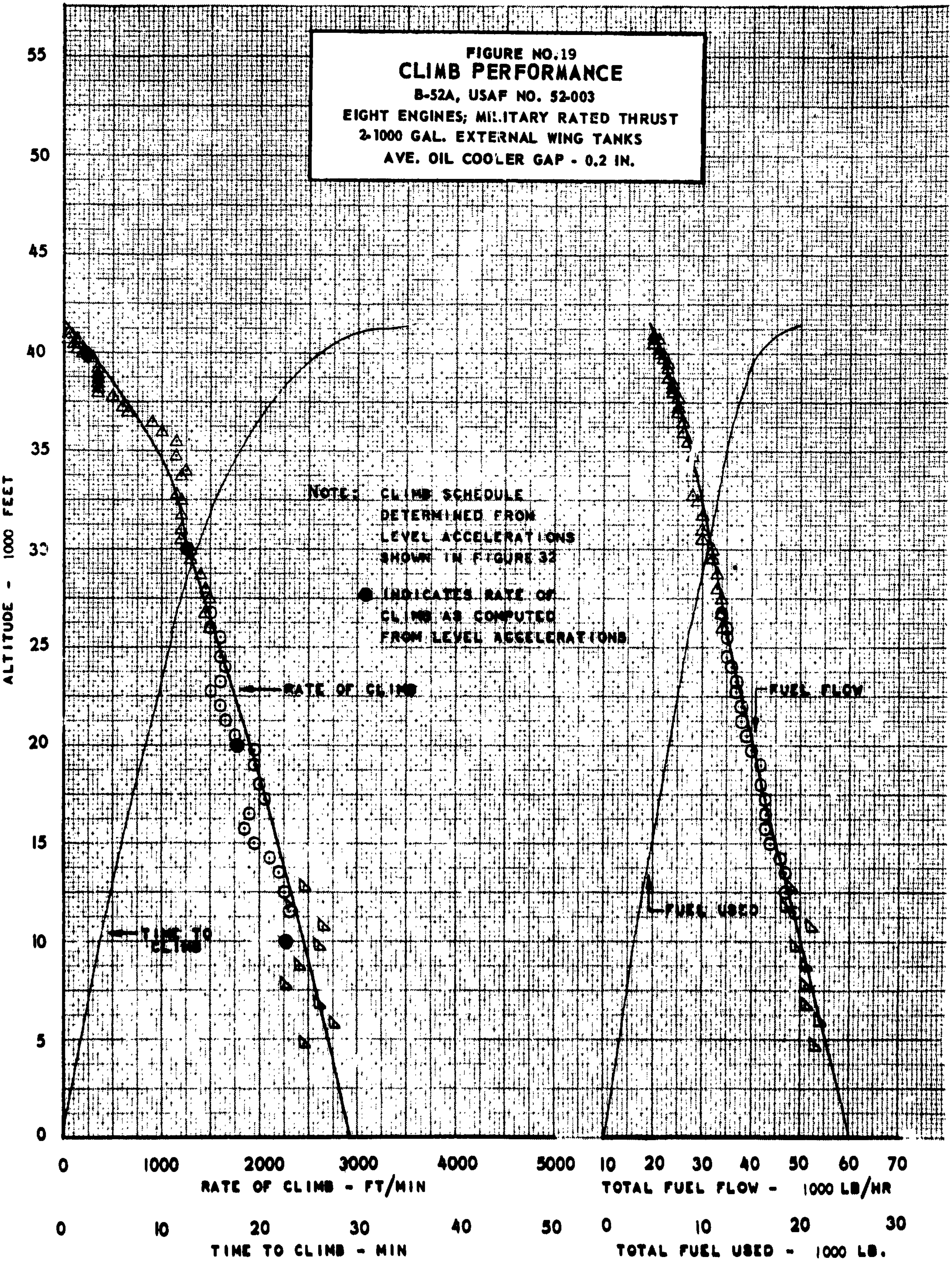
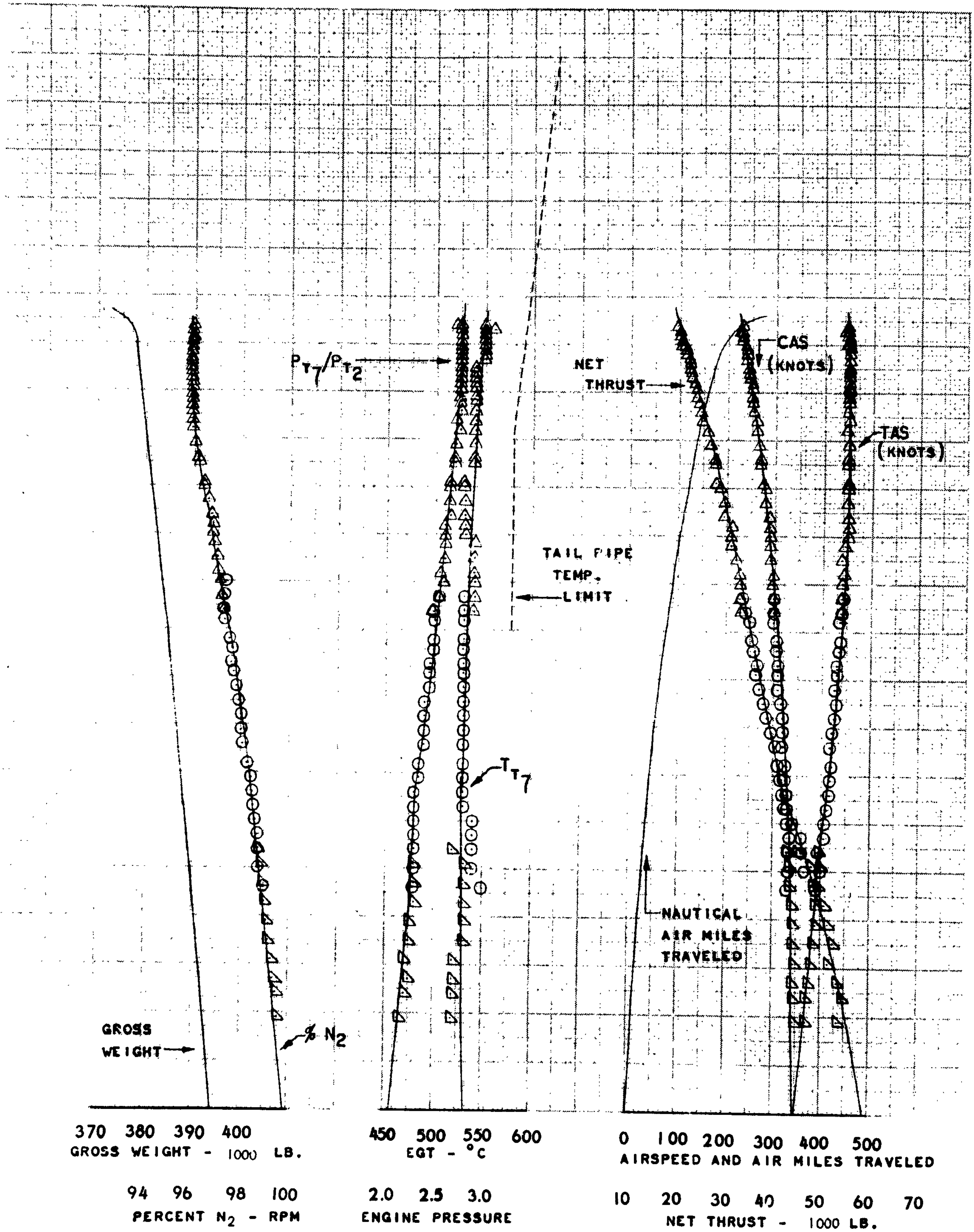


FIGURE NO. 19
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES; MILITARY RATED THRUST
2-1000 GAL. EXTERNAL WING TANKS
AVE. OIL COOLER GAP - 0.2 IN.
NOTE: CLIMB SCHEDULE DETERMINED FROM LEVEL ACCELERATIONS SHOWN IN FIGURE 32
● INDICATES RATE OF CLIMB AS COMPUTED FROM LEVEL ACCELERATIONS
RATE OF CLIMB
TIME TO CLIMB
FUEL FLOW
FUEL USED
ALTITUDE - 1000 FEET
0
5
10
15
20
25
30
35
40
45
50
55
0 1000 2000 3000 4000 5000
RATE OF CLIMB - FT/MIN
10 20 30 40 50 60 70
TOTAL FUEL FLOW - 1000 LB/HR
0 10 20 30 40 50
TIME TO CLIMB - MIN
0 10 20 30
TOTAL FUEL USED - 1000 LB.



P_{T_7}/P_{T_2}
NET THRUST
CAS (KNOTS)
TAS (KNOTS)
TAIL PIPE TEMP. LIMIT
T_{T_7}
NAUTICAL AIR MILES TRAVELED
GROSS WEIGHT
% N_2
370 380 390 400
GROSS WEIGHT - 1000 LB.
94 96 98 100
PERCENT N_2 - RPM
450 500 550 600
EGT - °C
2.0 2.5 3.0
ENGINE PRESSURE RATIO
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

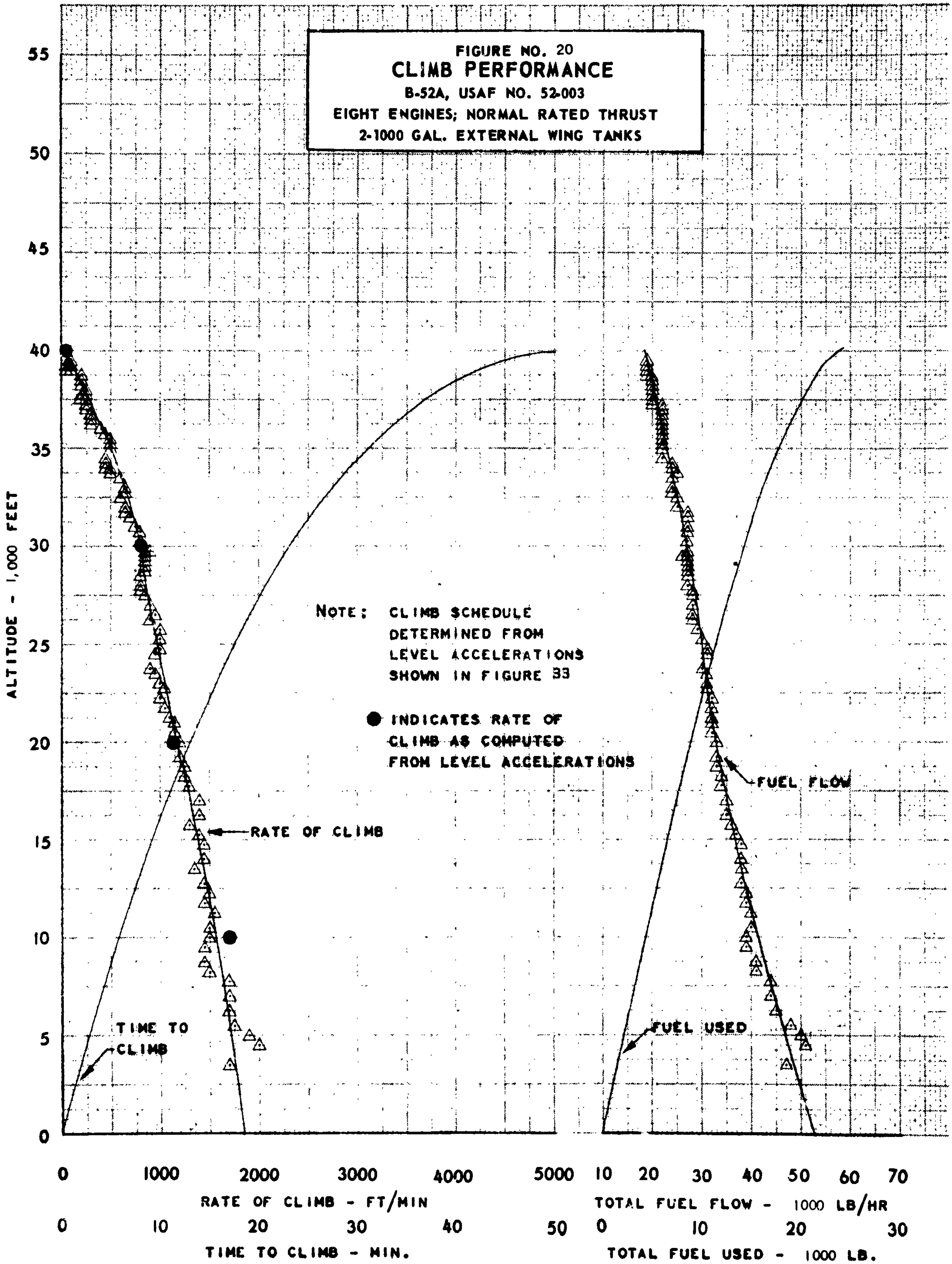
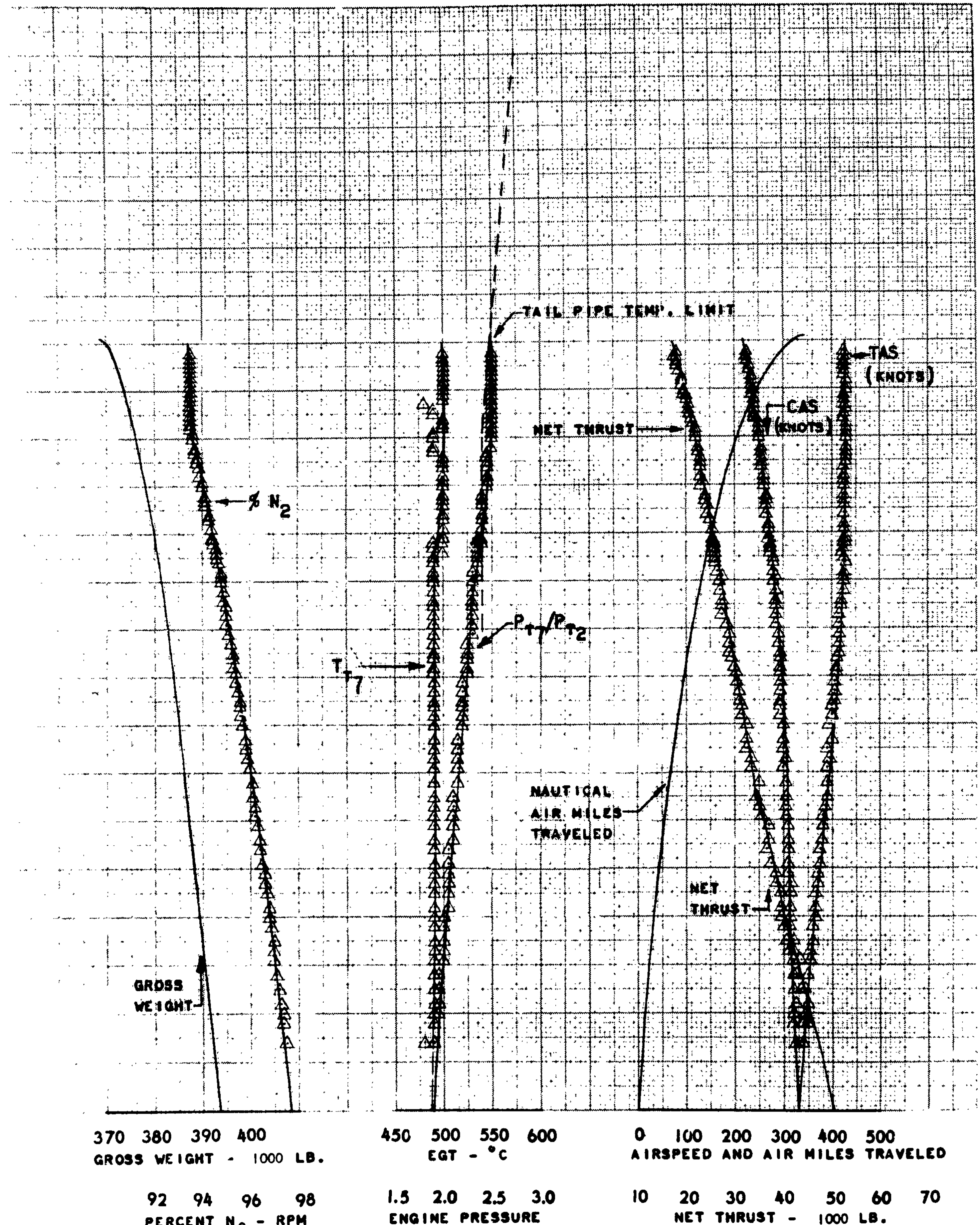


FIGURE NO. 20
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES; NORMAL RATED THRUST
2-1000 GAL. EXTERNAL WING TANKS
NOTE: CLIMB SCHEDULE DETERMINED FROM LEVEL ACCELERATIONS SHOWN IN FIGURE 33
● INDICATES RATE OF CLIMB AS COMPUTED FROM LEVEL ACCELERATIONS
RATE OF CLIMB
TIME TO CLIMB
FUEL FLOW
FUEL USED
ALTITUDE - 1,000 FEET
0
5
10
15
20
25
30
35
40
45
50
55
0 1000 2000 3000 4000 5000
RATE OF CLIMB - FT/MIN
0 10 20 30 40 50
TIME TO CLIMB - MIN.
10 20 30 40 50 60 70
TOTAL FUEL FLOW - 1000 LB/HR
0 10 20 30
TOTAL FUEL USED - 1000 LB.


TAIL PIPE TEMP. LIMIT
TAS (KNOTS)
CAS (KNOTS)
NET THRUST
% N_2
P_{T7}/P_{T2}
T_{T7}
NAUTICAL AIR MILES TRAVELED
NET THRUST
GROSS WEIGHT
370 380 390 400
GROSS WEIGHT - 1000 LB.
92 94 96 98
PERCENT N_2 - RPM
450 500 550 600
EGT - °C
1.5 2.0 2.5 3.0
ENGINE PRESSURE RATIO
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

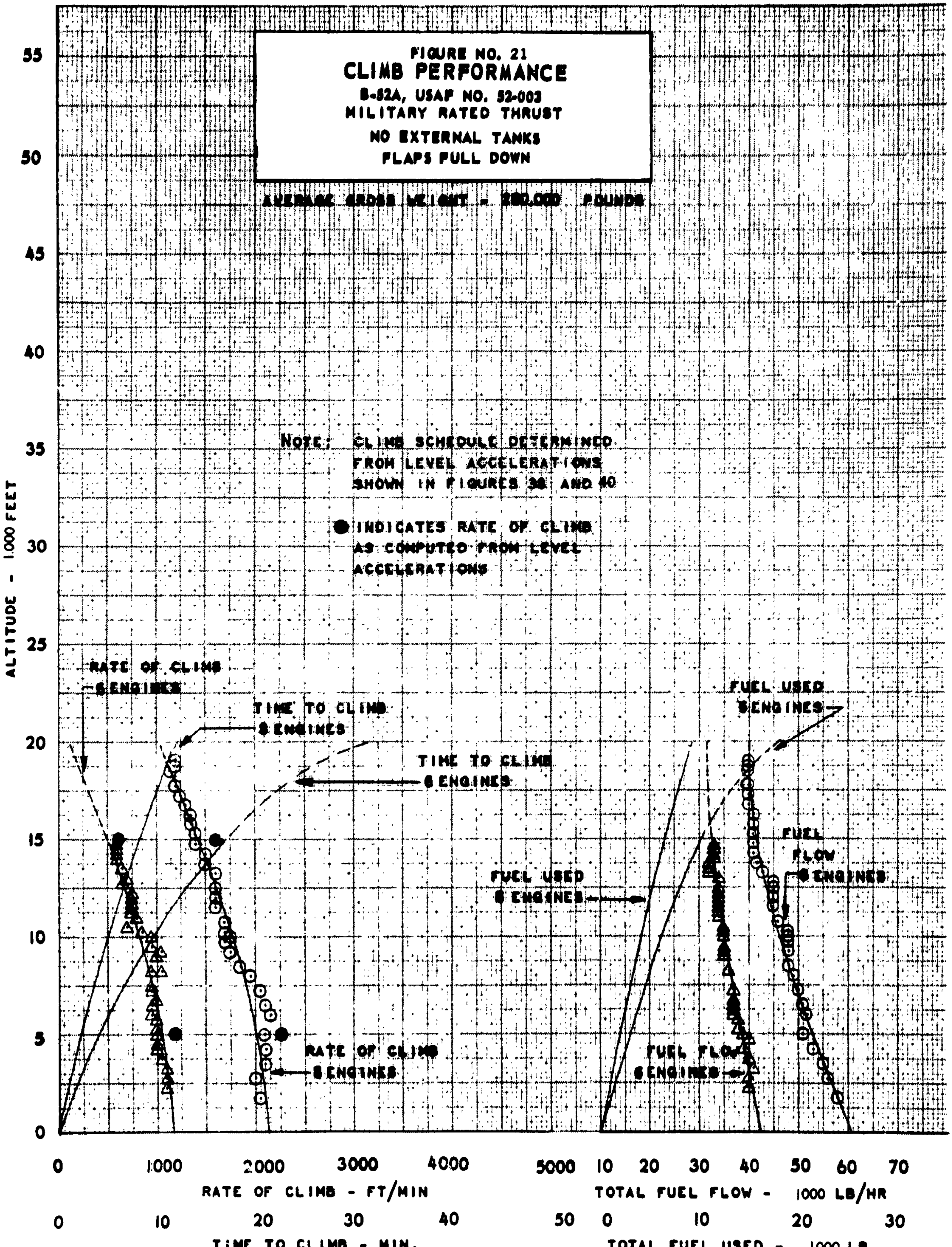
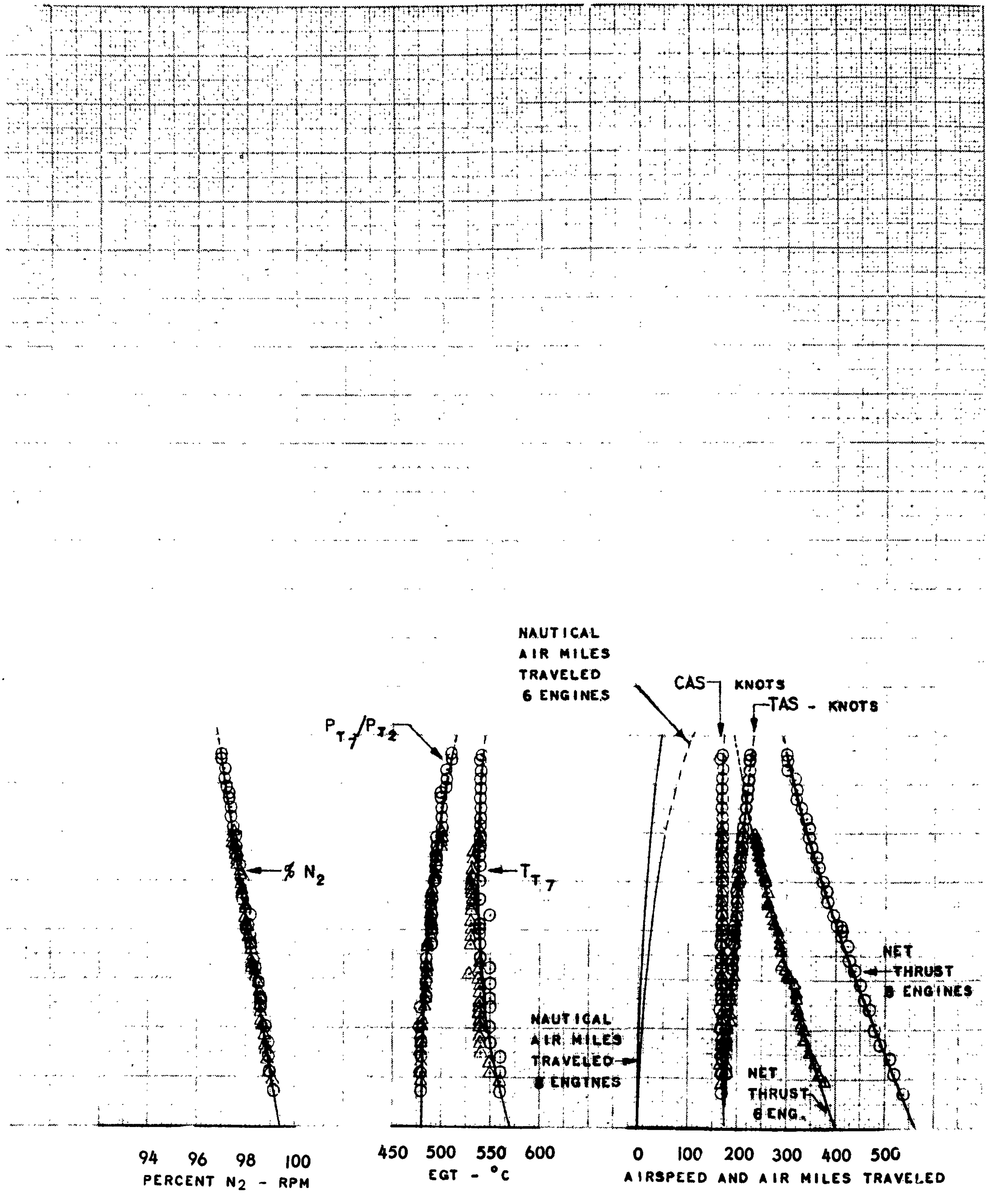


FIGURE NO. 21
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
MILITARY RATED THRUST
NO EXTERNAL TANKS
FLAPS FULL DOWN
AVERAGE GROSS WEIGHT POUNDS
NOTE: CLIMB SCHEDULE DETERMINED FROM LEVEL ACCELERATIONS SHOWN IN FIGURES 38 AND 40
INDICATES RATE OF CLIMB AS COMPUTED FROM LEVEL ACCELERATIONS
RATE OF CLIMB ENGINES
TIME TO CLIMB ENGINES
TIME TO CLIMB ENGINES
RATE OF CLIMB ENGINES
FUEL USED ENGINES
FUEL USED ENGINES
FUEL FLOW ENGINES
FUEL FLOW ENGINES
ALTITUDE - 1,000 FEET
0 5 10 15 20 25 30 35 40 45 50 55
0 1000 2000 3000 4000 5000
RATE OF CLIMB - FT/MIN
0 10 20 30 40 50
TIME TO CLIMB - MIN.
10 20 30 40 50 60 70
TOTAL FUEL FLOW - 1000 LB/HR
0 10 20 30
TOTAL FUEL USED - 1000 LB.


NAUTICAL AIR MILES TRAVELED 6 ENGINES
CAS KNOTS
TAS - KNOTS
P_{T_7}/P_{T_2}
% N_2
T_{T_7}
NET THRUST 8 ENGINES
NAUTICAL AIR MILES TRAVELED 8 ENGINES
NET THRUST 6 ENG.
94 96 98 100
PERCENT N_2 - RPM
450 500 550 600
EGT - °C
2.0 2.5 3.0
ENGINE PRESSURE RATIO
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

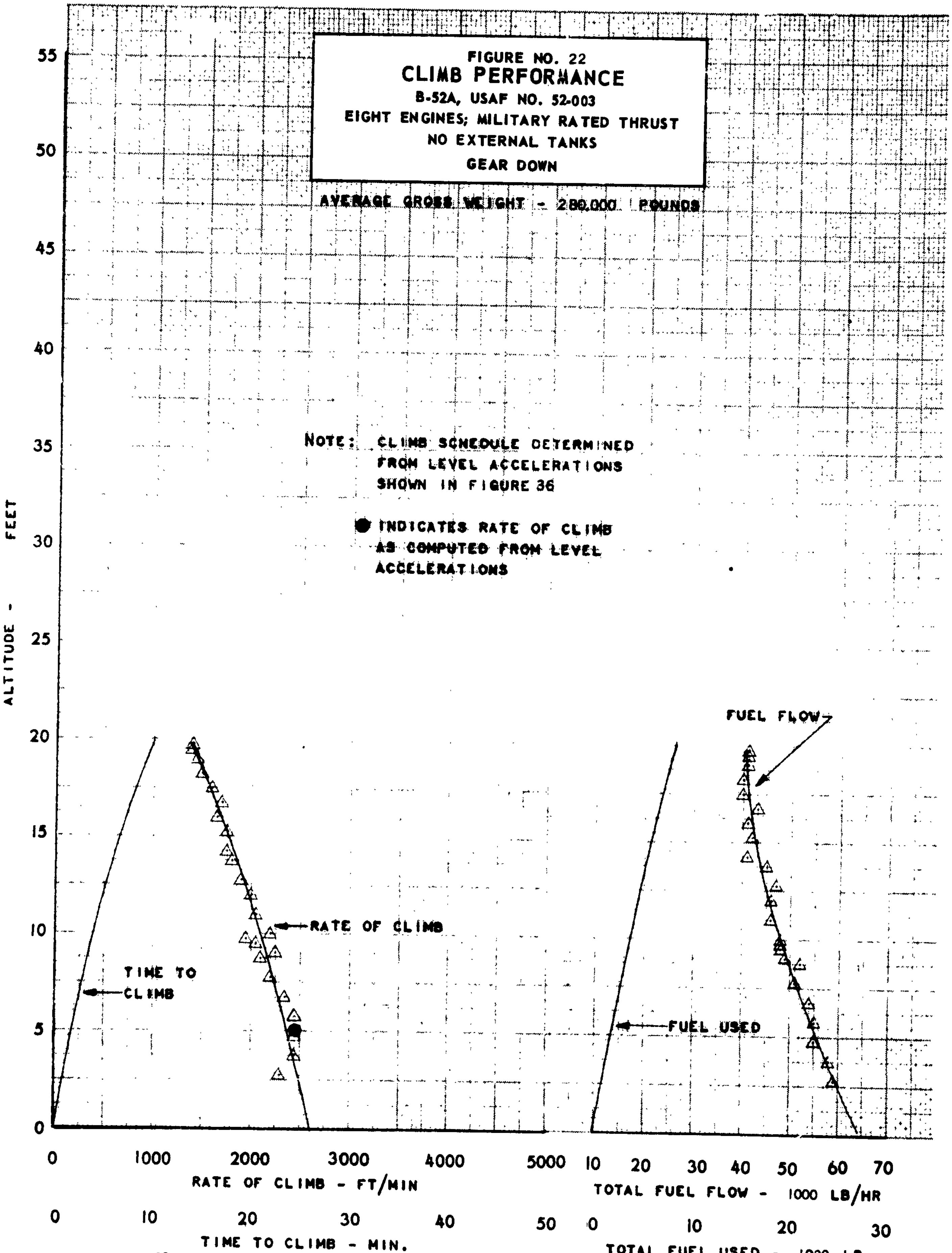
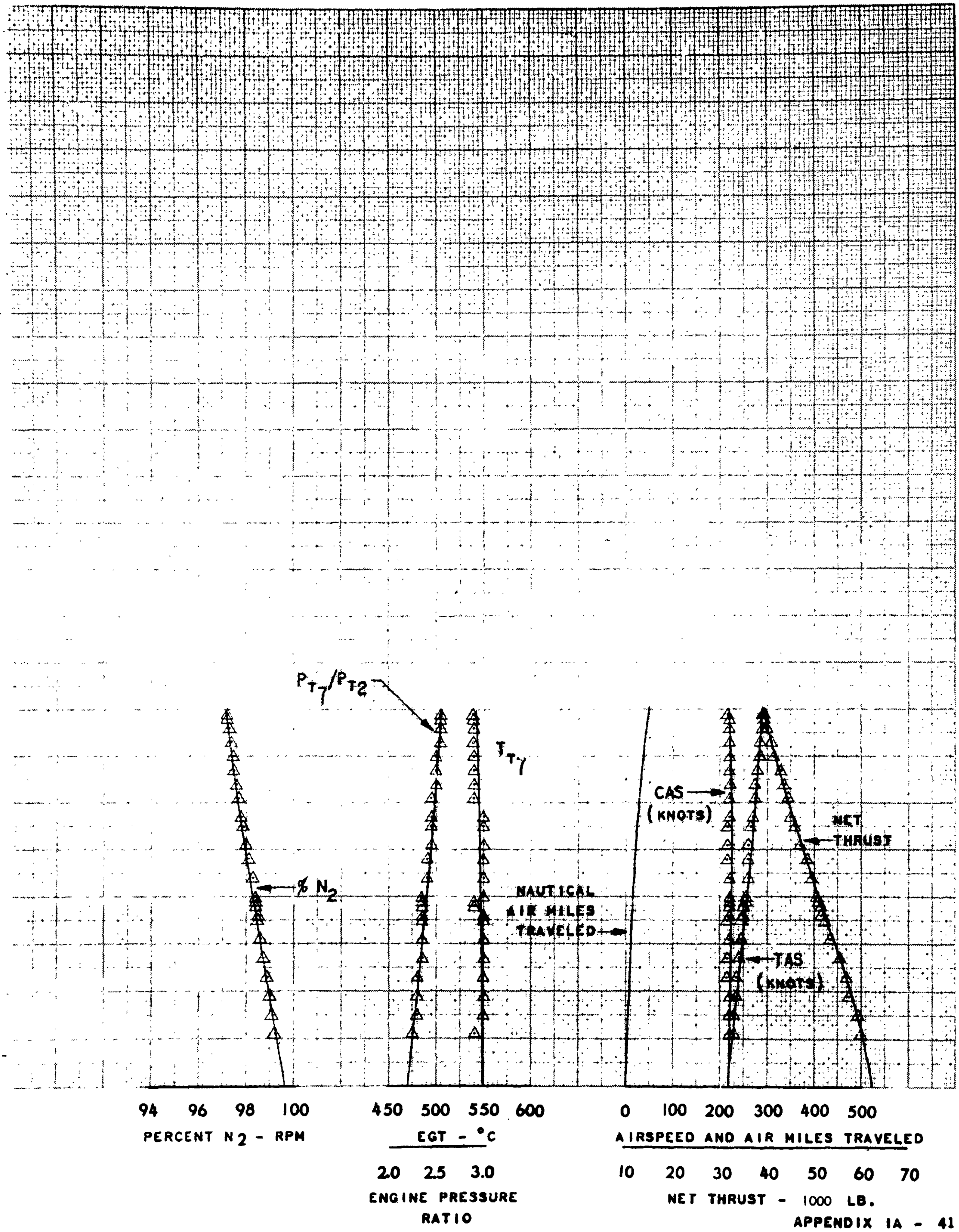


FIGURE NO. 22
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES; MILITARY RATED THRUST
NO EXTERNAL TANKS
GEAR DOWN
AVERAGE GROSS WEIGHT - 280,000 POUNDS
NOTE: CLIMB SCHEDULE DETERMINED FROM LEVEL ACCELERATIONS SHOWN IN FIGURE 36
● INDICATES RATE OF CLIMB AS COMPUTED FROM LEVEL ACCELERATIONS
ALTITUDE - FEET
55
50
45
40
35
30
25
20
15
10
5
0
TIME TO CLIMB
RATE OF CLIMB
FUEL FLOW
FUEL USED
0
1000
2000
3000
4000
5000
RATE OF CLIMB - FT/MIN
0
10
20
30
40
50
TIME TO CLIMB - MIN.
10
20
30
40
50
60
70
TOTAL FUEL FLOW - 1000 LB/HR
0
10
20
30
TOTAL FUEL USED - 1000 LB.



P_{T7}/P_{T2}
T_{T7}
% N_2
CAS (KNOTS)
NET THRUST
NAUTICAL AIR MILES TRAVELED
TAS (KNOTS)
94 96 98 100
PERCENT N_2 - RPM
450 500 550 600
EGT - °C
2.0 2.5 3.0
ENGINE PRESSURE RATIO
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

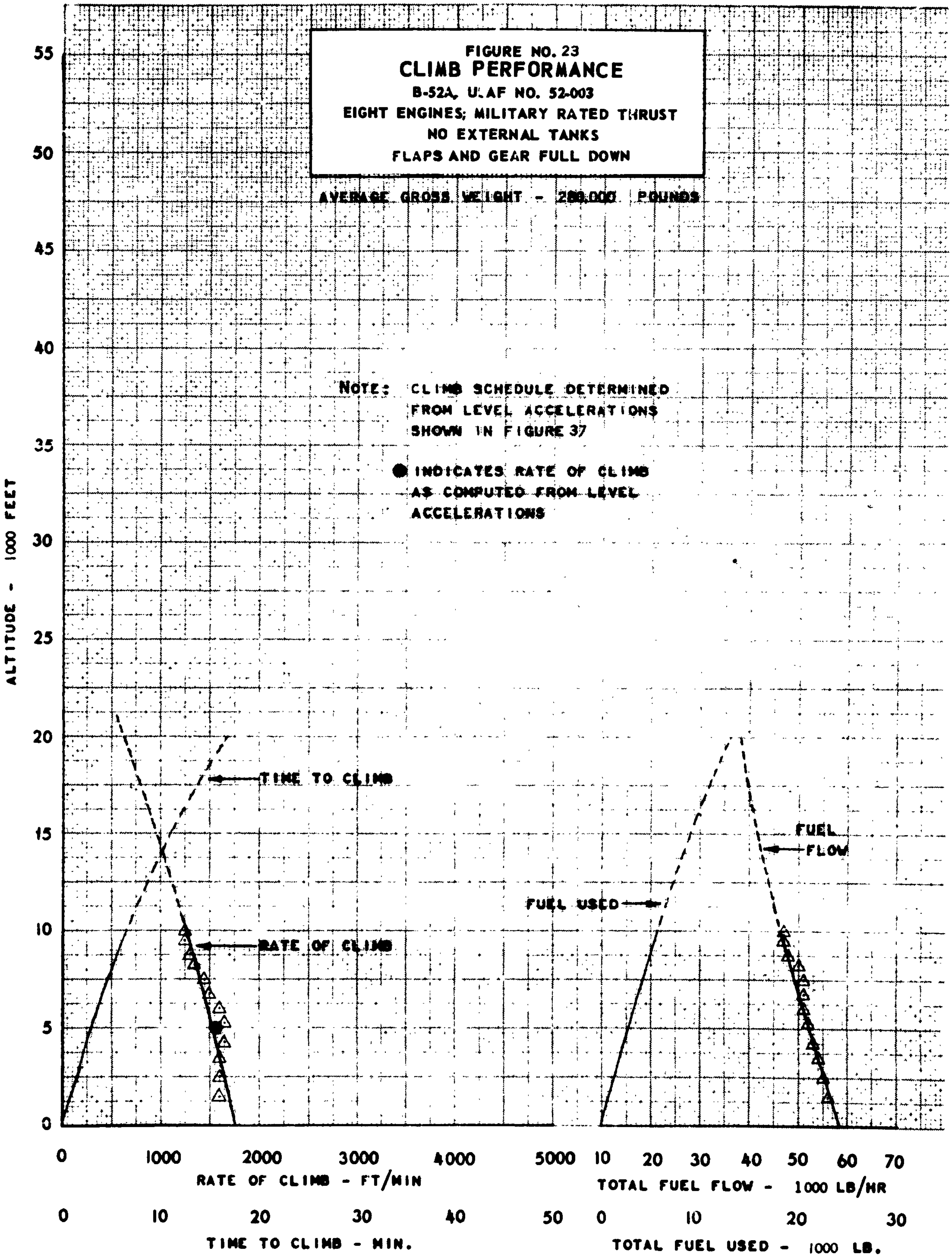
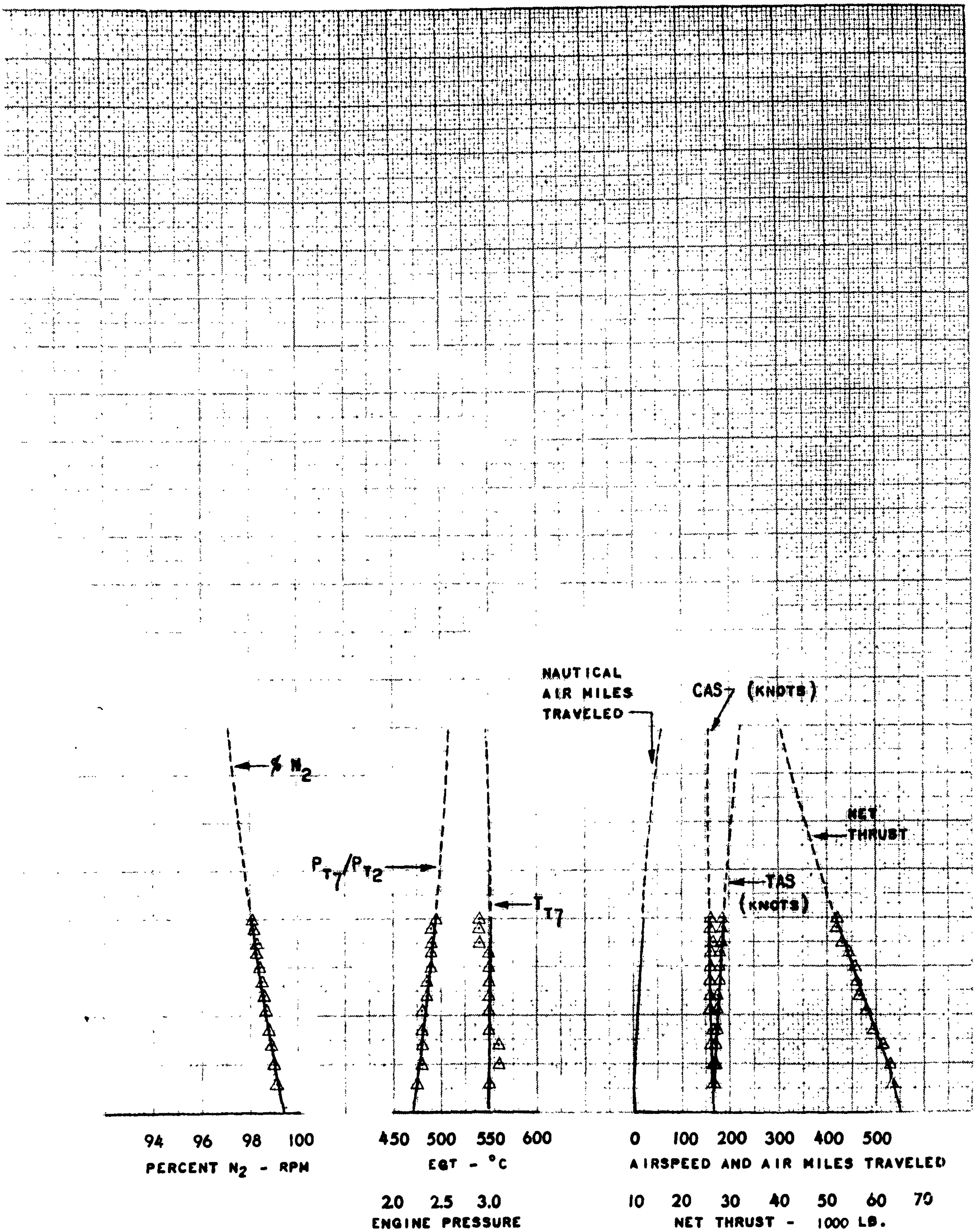


FIGURE NO. 23
CLIMB PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES; MILITARY RATED THRUST
NO EXTERNAL TANKS
FLAPS AND GEAR FULL DOWN
AVERAGE GROSS WEIGHT - 280,000 POUNDS
NOTE: CLIMB SCHEDULE DETERMINED FROM LEVEL ACCELERATIONS SHOWN IN FIGURE 37
● INDICATES RATE OF CLIMB AS COMPUTED FROM LEVEL ACCELERATIONS
TIME TO CLIMB
RATE OF CLIMB
FUEL FLOW
FUEL USED
ALTITUDE - 1000 FEET
0
5
10
15
20
25
30
35
40
45
50
55
0 1000 2000 3000 4000 5000
RATE OF CLIMB - FT/MIN
0 10 20 30 40 50
TIME TO CLIMB - MIN.
10 20 30 40 50 60 70
TOTAL FUEL FLOW - 1000 LB/HR
0 10 20 30
TOTAL FUEL USED - 1000 LB.



NAUTICAL AIR MILES TRAVELED
CAS (KNOTS)
% N2
NET THRUST
PT7/PT2
TT7
TAS (KNOTS)
94 96 98 100
PERCENT N2 - RPM
450 500 550 600
EGT - °C
2.0 2.5 3.0
ENGINE PRESSURE RATIO
0 100 200 300 400 500
AIRSPEED AND AIR MILES TRAVELED
10 20 30 40 50 60 70
NET THRUST - 1000 LB.

FIGURE NO. 24
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
EIGHT ENGINES; MILITARY RATED THRUST
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

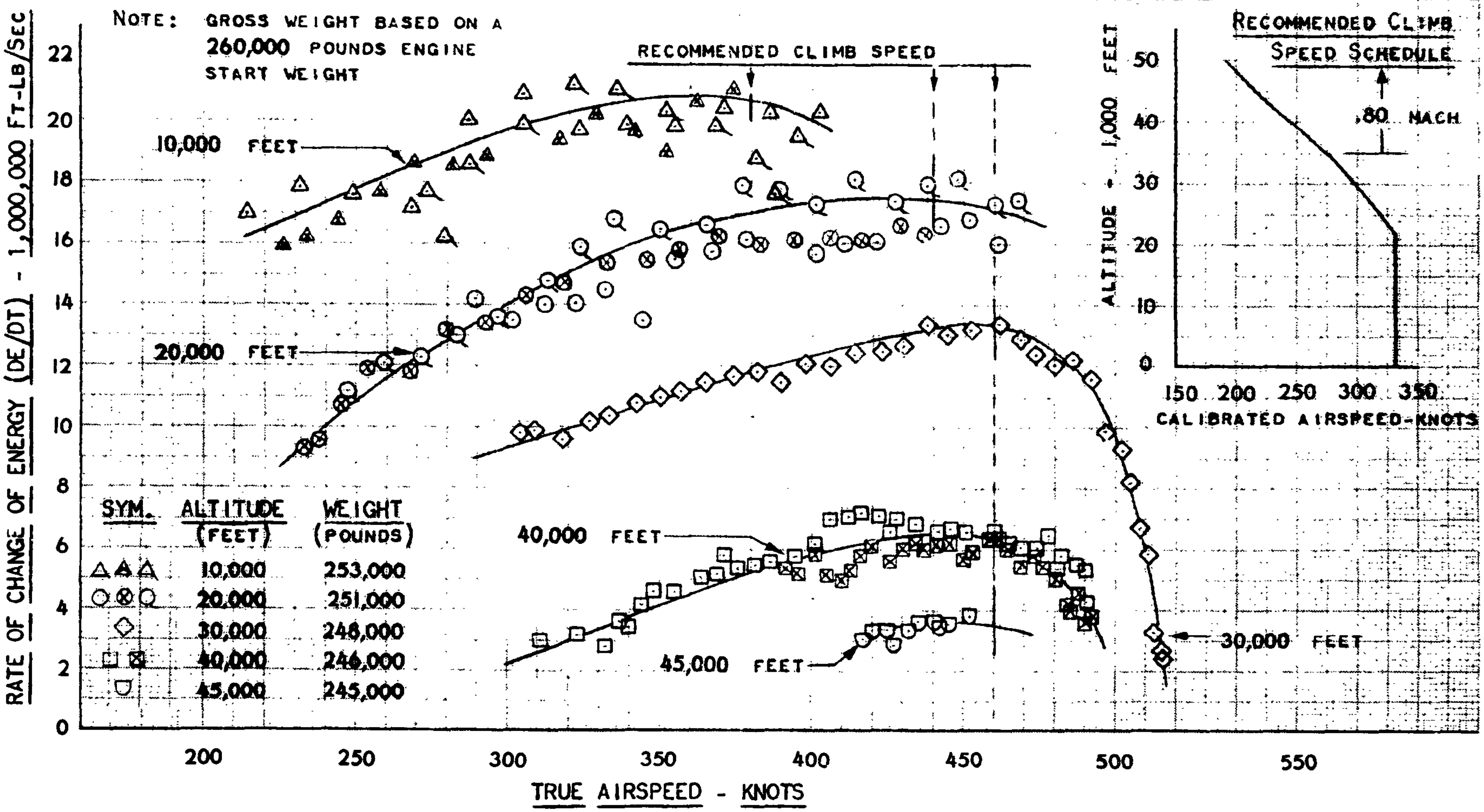


FIGURE NO. 25

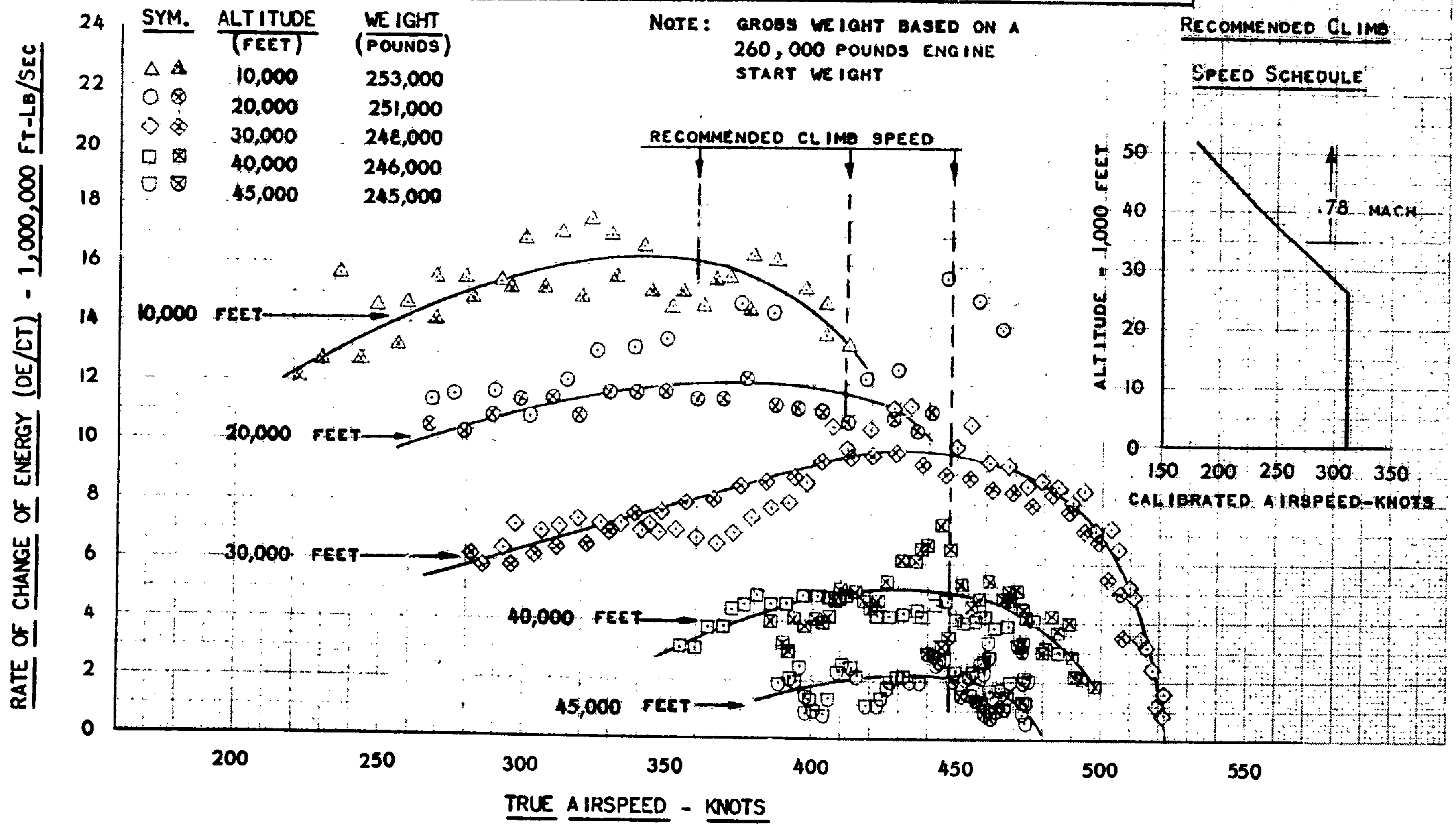
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS

B-52A, USAF NO. 52-003

EIGHT ENGINES; NORMAL RATED THRUST

NO EXTERNAL TANKS

AVE. OIL COOLER GAP - 0.2 IN.



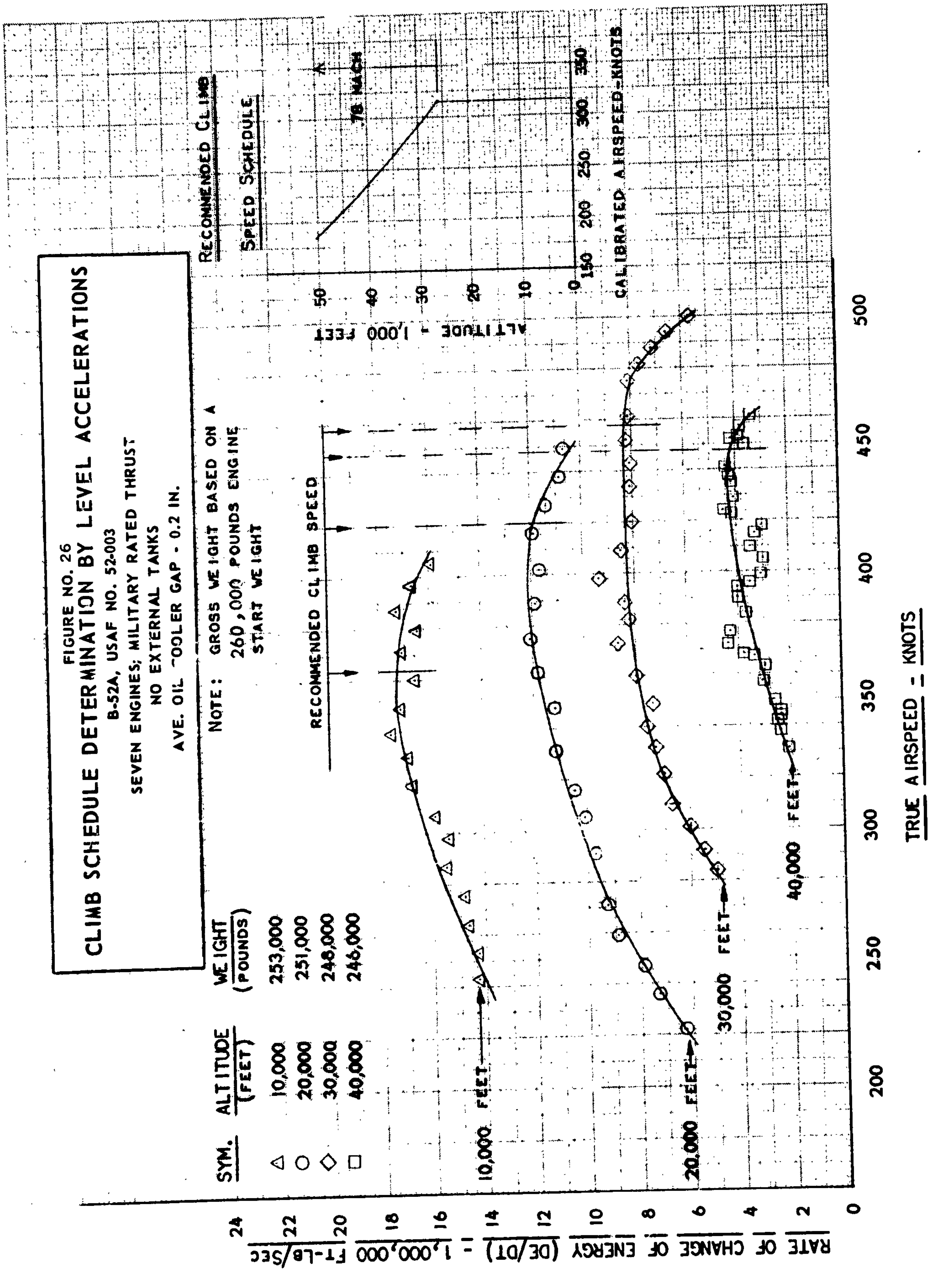


FIGURE NO. 26
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
SEVEN ENGINES; MILITARY RATED THRUST
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

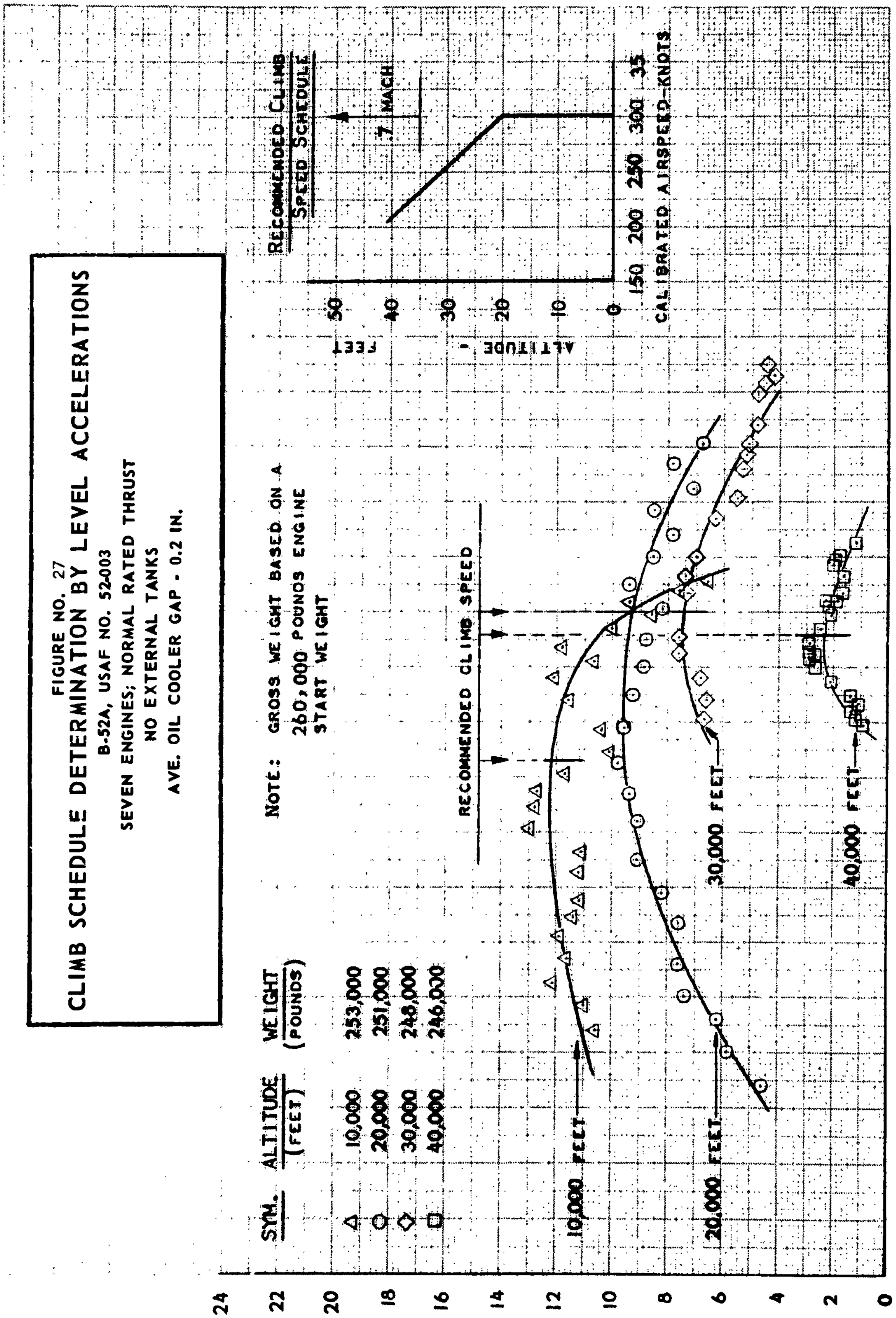


FIGURE NO. 27
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
SEVEN ENGINES; NORMAL RATED THRUST
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

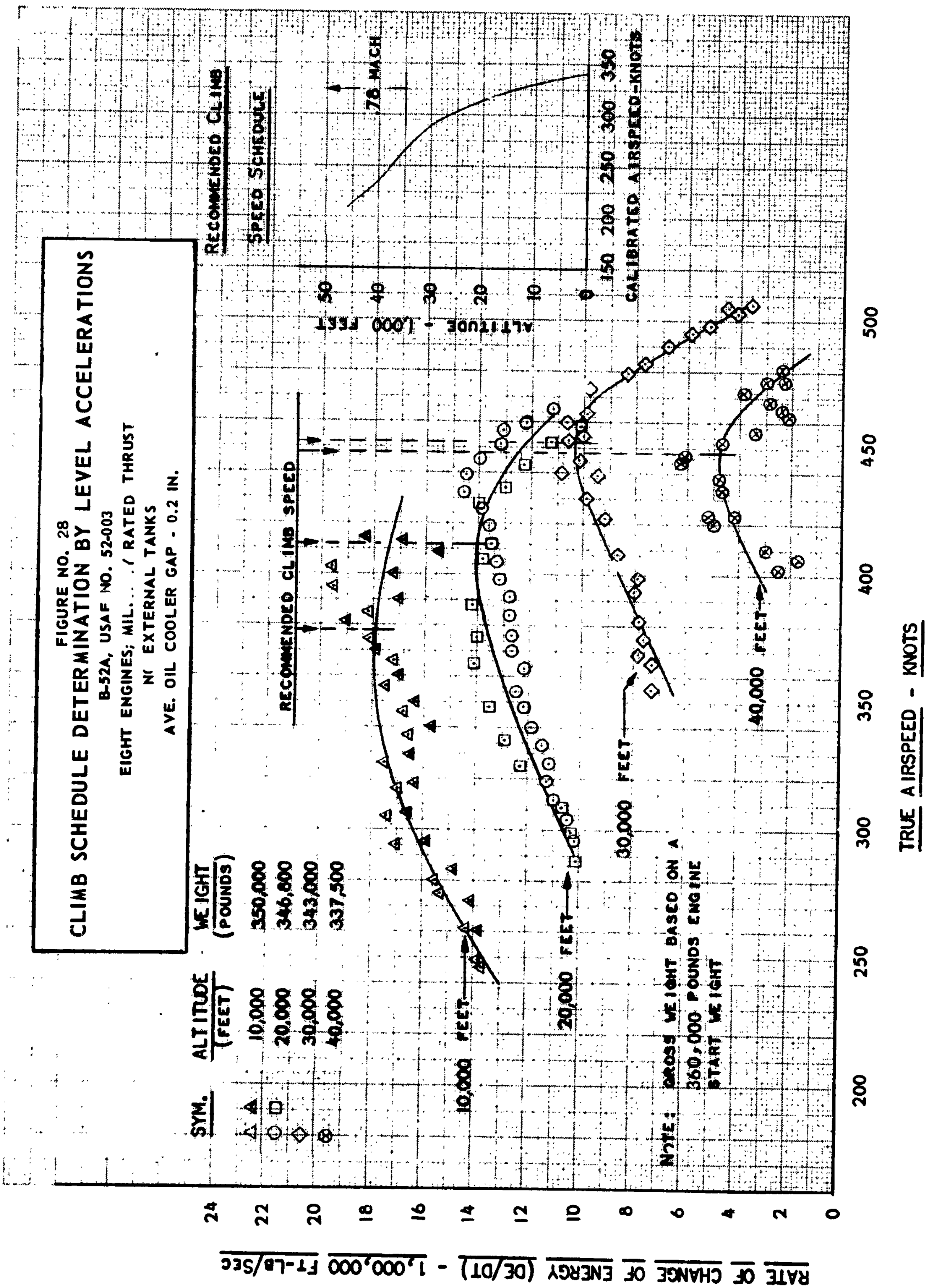


FIGURE NO. 28
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
EIGHT ENGINES; MIL... / RATED THRUST
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
10,000
20,000
30,000
40,000
350,000
346,800
343,000
337,500
RECOMMENDED CLIMB SPEED SCHEDULE
.78 MACH
ALTITUDE - 1,000 FEET
CALIBRATED AIRSPEED-KNOTS
RECOMMENDED CLIMB SPEED
10,000 FEET
20,000 FEET
30,000 FEET
40,000 FEET
NOTE: GROSS WEIGHT BASED ON A 360,000 POUNDS ENGINE START WEIGHT
TRUE AIRSPEED - KNOTS
RATE OF CHANGE OF ENERGY (DE/DT) - 1,000,000 FT-LB/SEC

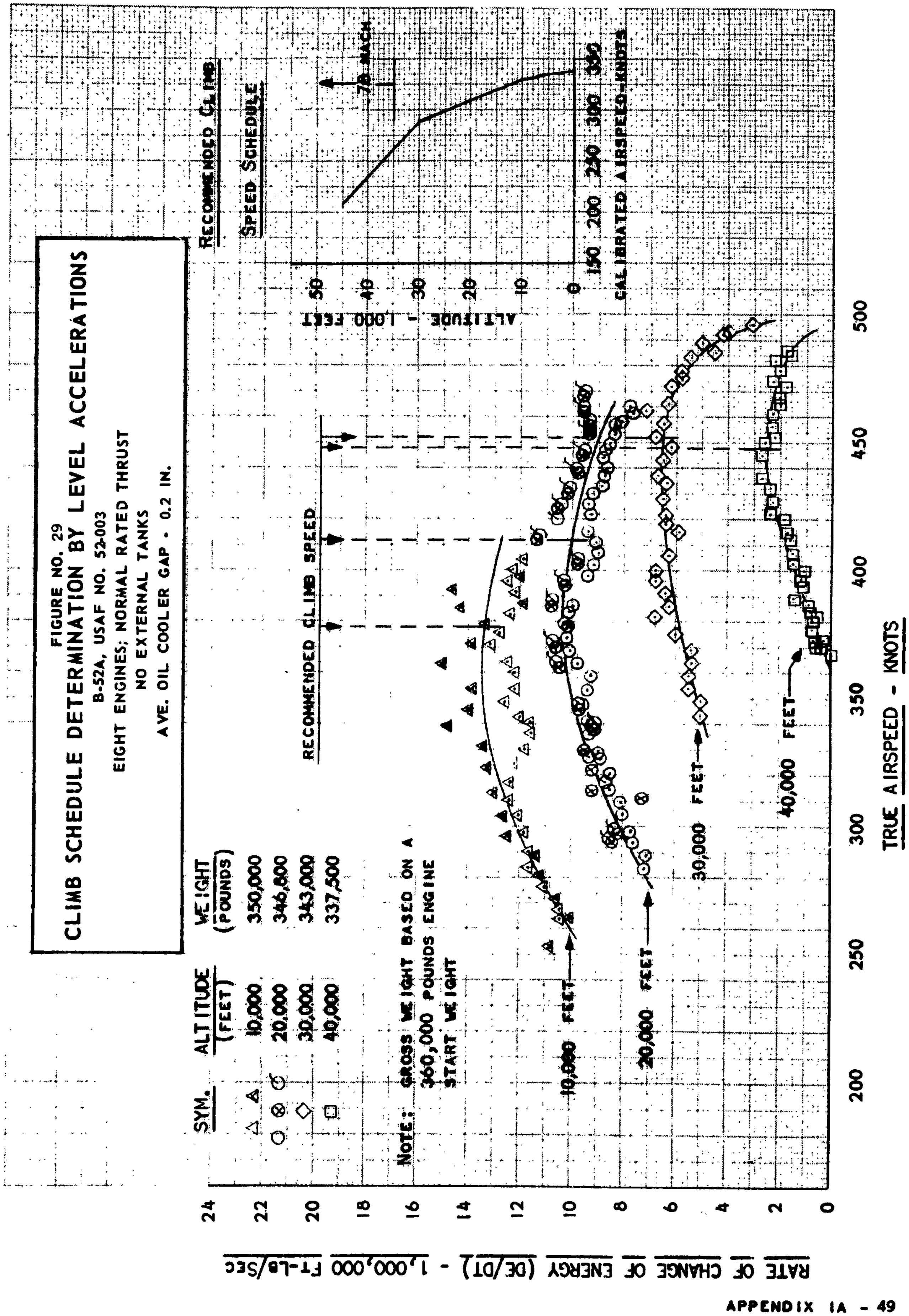


FIGURE NO. 29
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
EIGHT ENGINES; NORMAL RATED THRUST
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

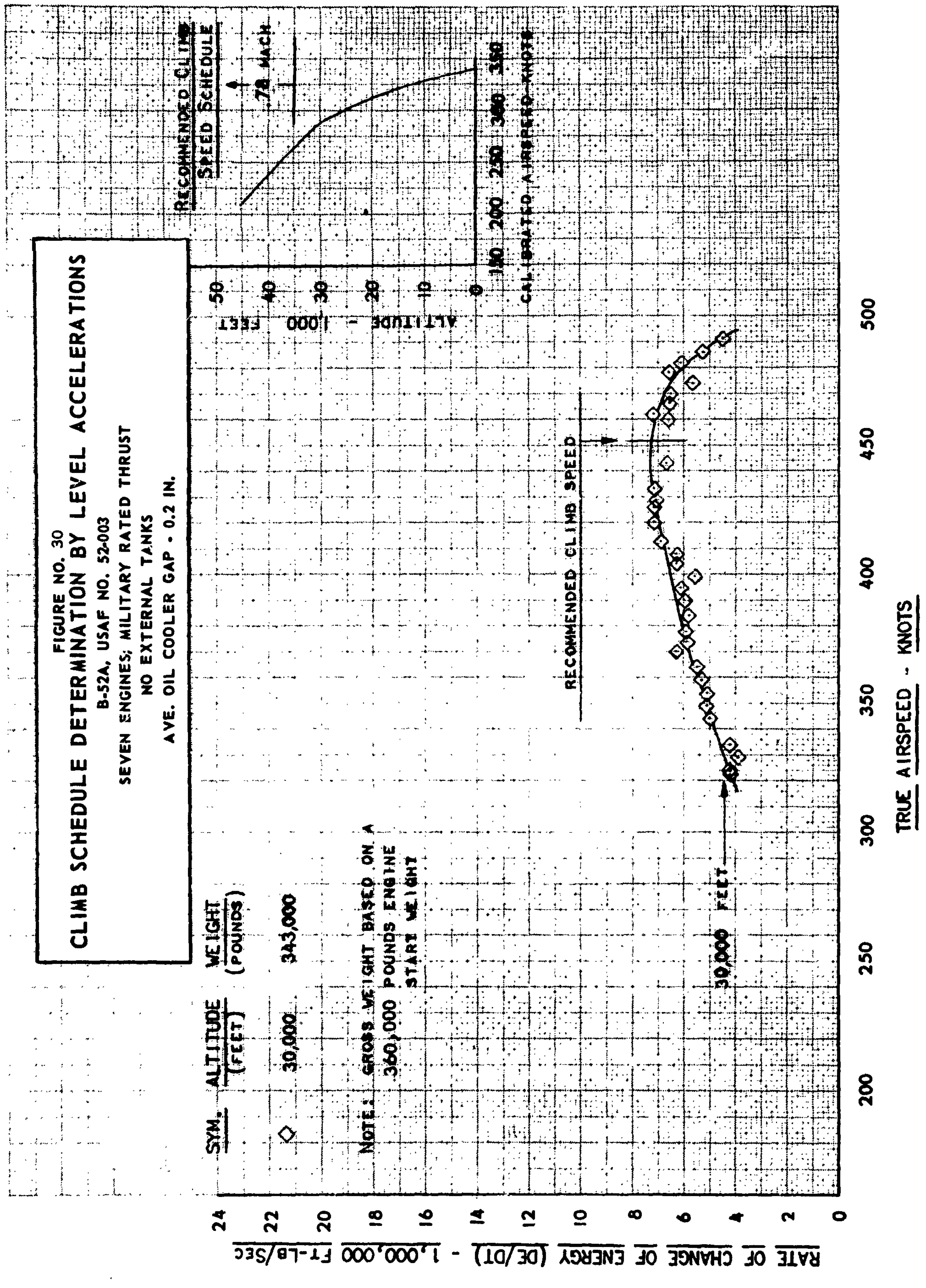


FIGURE NO. 30
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
SEVEN ENGINES; MILITARY RATED THRUST
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
30,000
343,000
NOTE: GROSS WEIGHT BASED ON A 360,000 POUNDS ENGINE START WEIGHT
RECOMMENDED CLIMB SPEED SCHEDULE
.78 MACH
ALTITUDE - 1000 FEET
50
40
30
20
10
0
150
200
250
300
350
CALIBRATED AIRSPEED - KNOTS
RECOMMENDED CLIMB SPEED
30,000 FEET
RATE OF CHANGE OF ENERGY (DE/DT) - 1,000,000 FT-LB/SEC
24
22
20
18
16
14
12
10
8
6
4
2
0
200
250
300
350
400
450
500
TRUE AIRSPEED - KNOTS

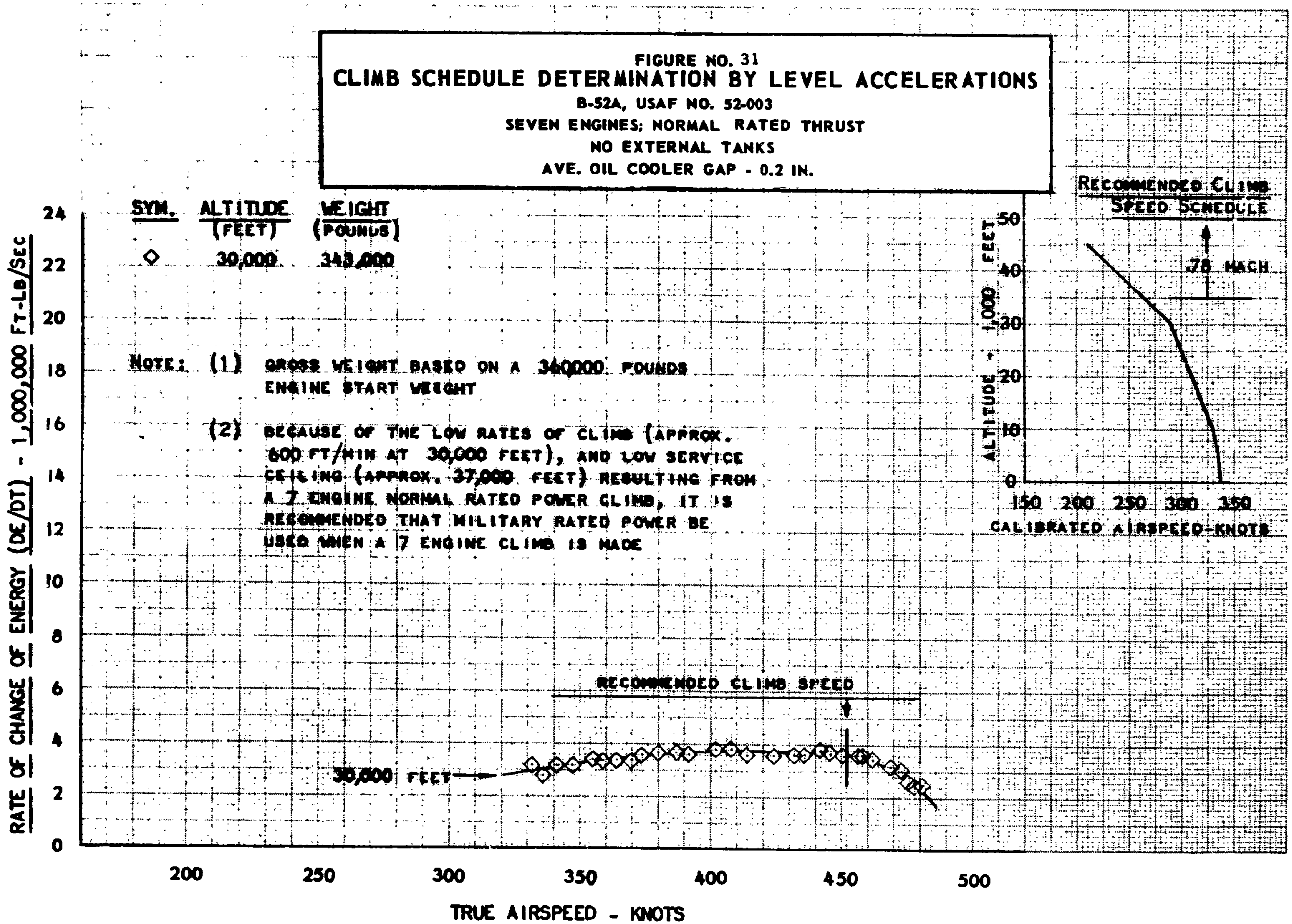


FIGURE NO. 31
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
SEVEN ENGINES; NORMAL RATED THRUST
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

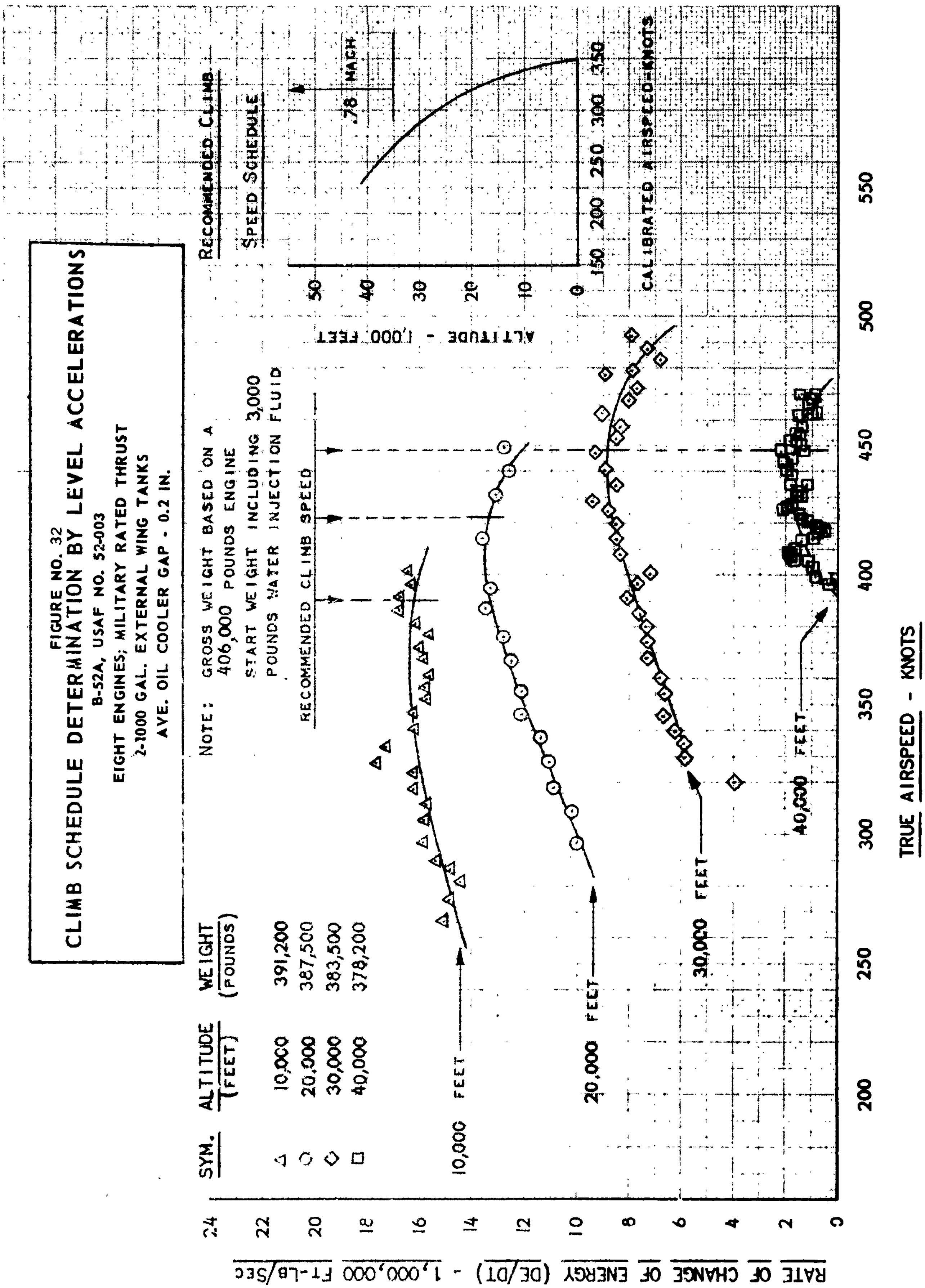


FIGURE NO. 32
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
EIGHT ENGINES; MILITARY RATED THRUST
2-1000 GAL. EXTERNAL WING TANKS
AVE. OIL COOLER GAP - 0.2 IN.

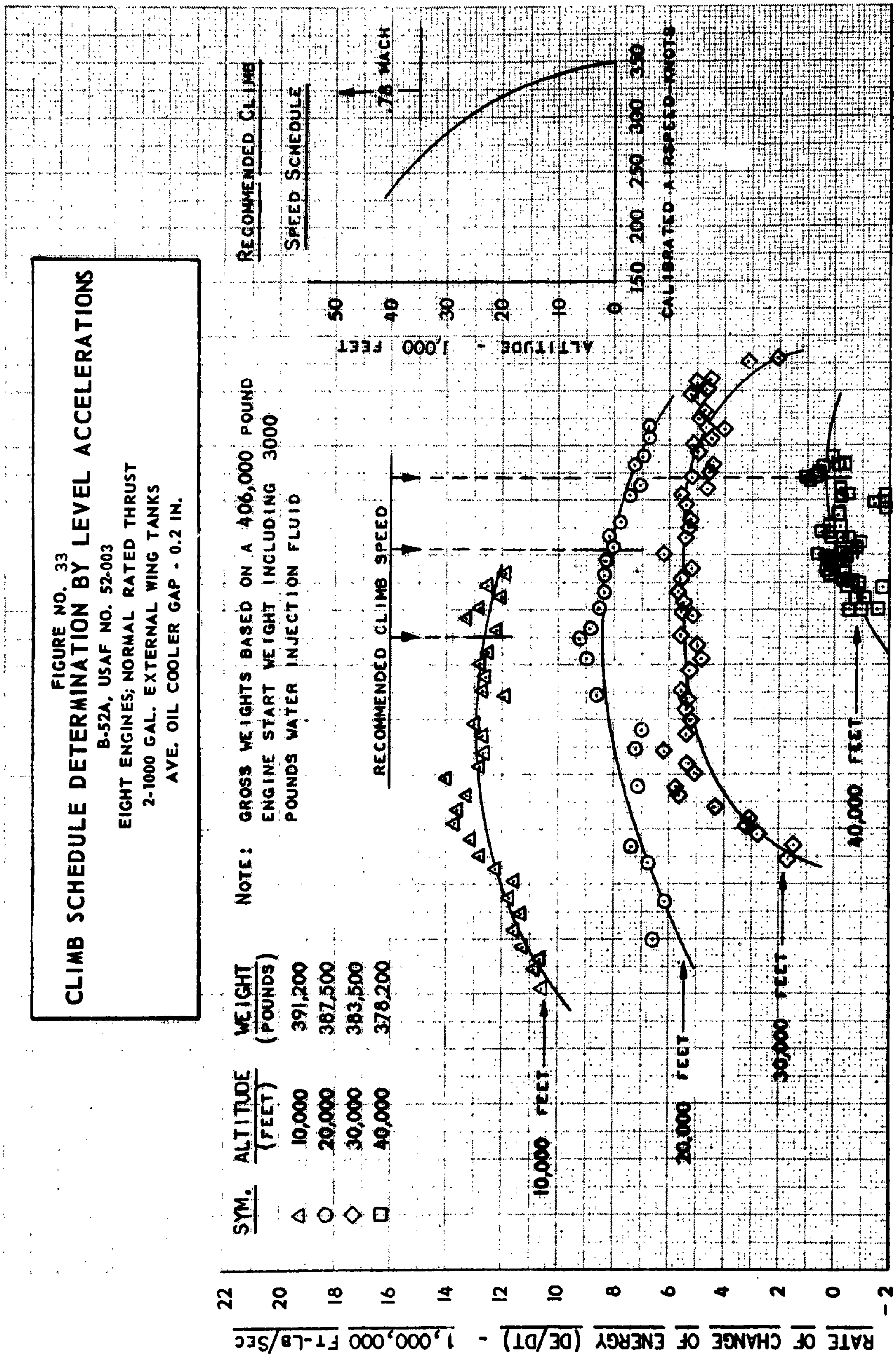


FIGURE NO. 33
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
EIGHT ENGINES; NORMAL RATED THRUST
2-1000 GAL. EXTERNAL WING TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
10,000
391,200
20,000
387,500
30,000
383,500
40,000
378,200
NOTE: GROSS WEIGHTS BASED ON A 406,000 POUND ENGINE START WEIGHT INCLUDING 3000 POUNDS WATER INJECTION FLUID
RECOMMENDED CLIMB SPEED
RECOMMENDED CLIMB SPEED SCHEDULE
.78 MACH
ALTITUDE - 1,000 FEET
CALIBRATED AIRSPEED - KNOTS
10,000 FEET
20,000 FEET
30,000 FEET
40,000 FEET
RATE OF CHANGE OF ENERGY (DE/DT) - 1,000,000 FT-LB/SEC
TRUE AIRSPEED - KNOTS

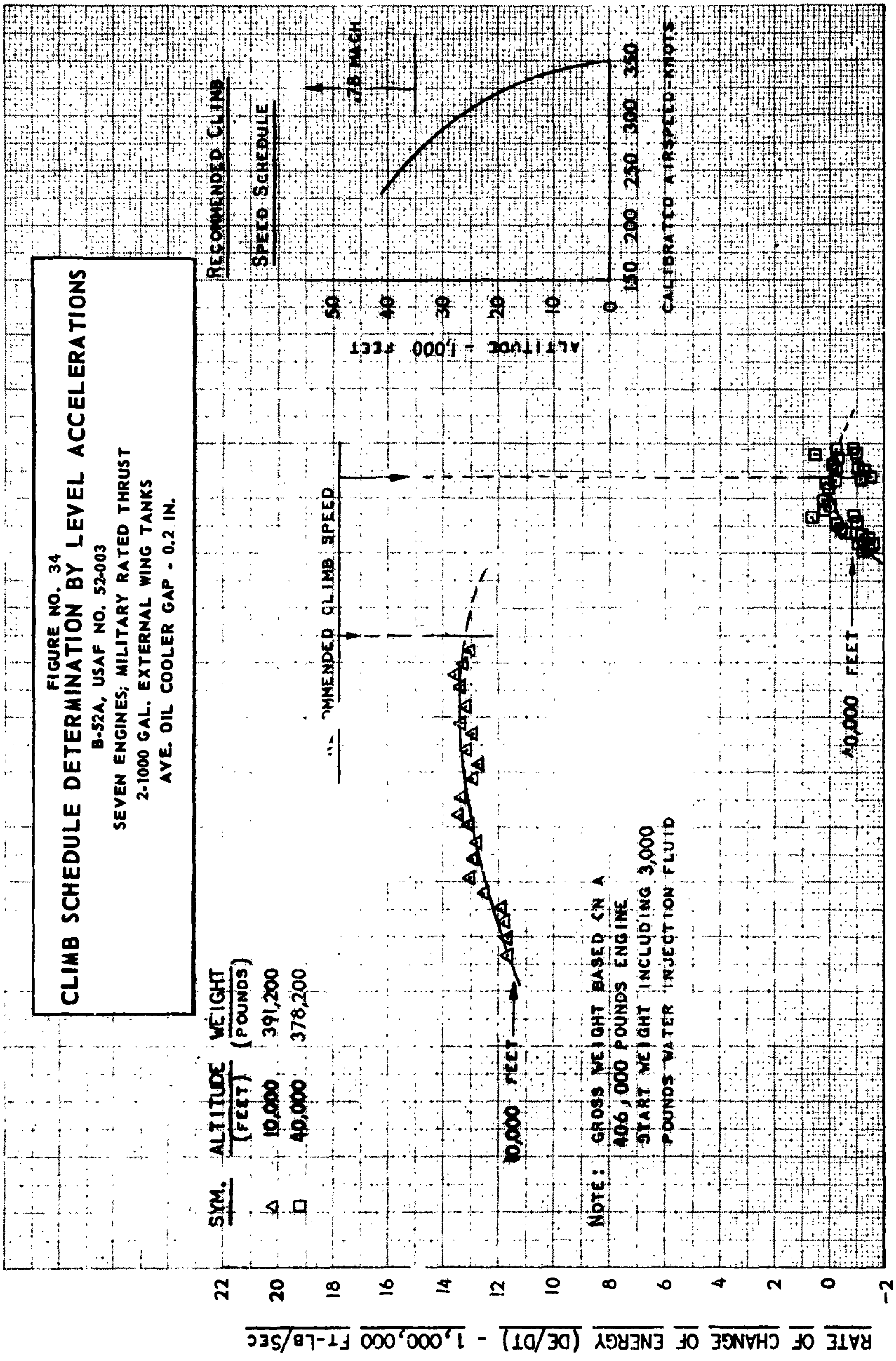


FIGURE NO. 34
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
SEVEN ENGINES; MILITARY RATED THRUST
2-1000 GAL. EXTERNAL WING TANKS
AVE. OIL COOLER GAP - 0.2 IN.

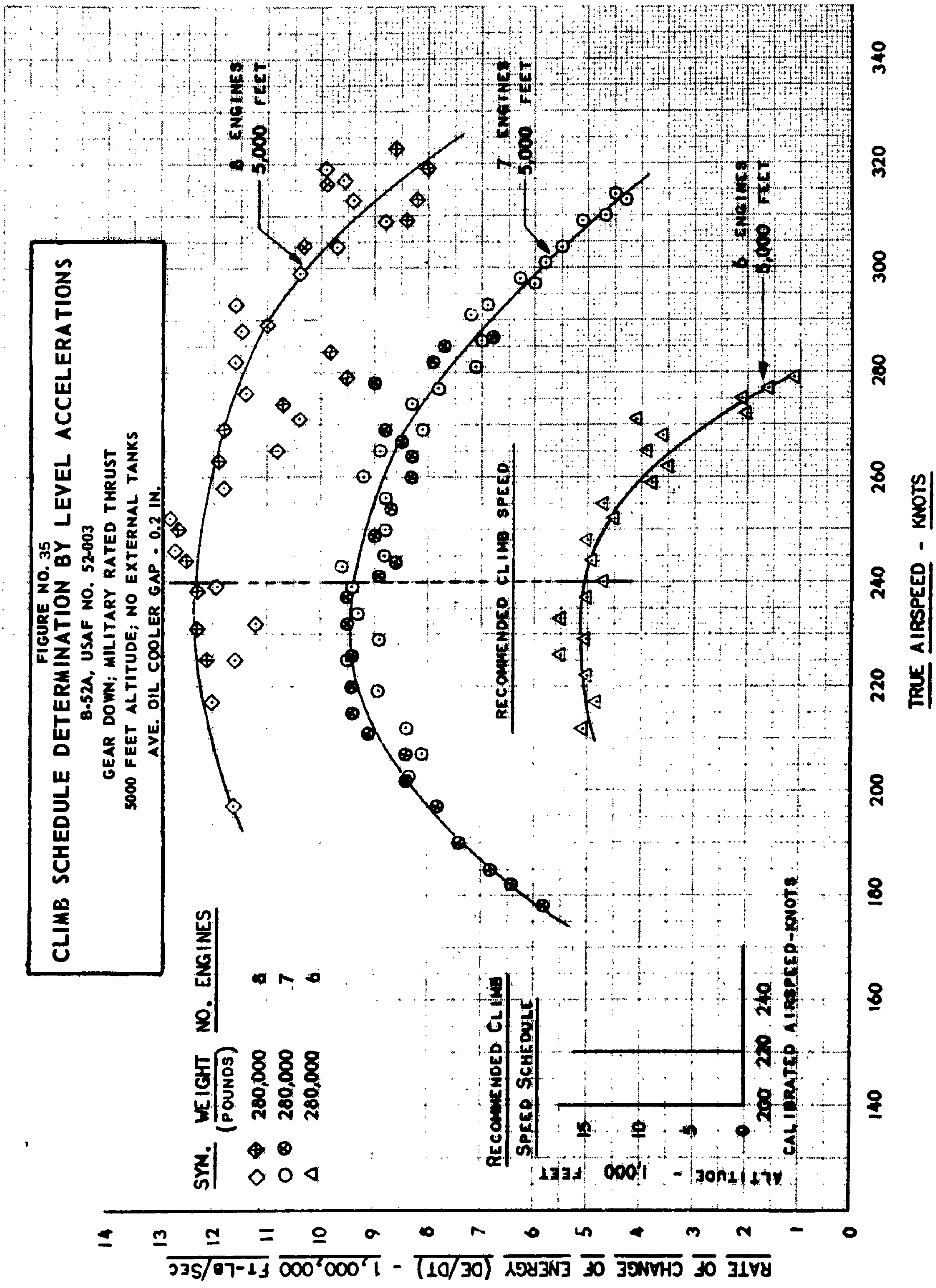


FIGURE NO. 35
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
GEAR DOWN; MILITARY RATED THRUST
5000 FEET ALTITUDE; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

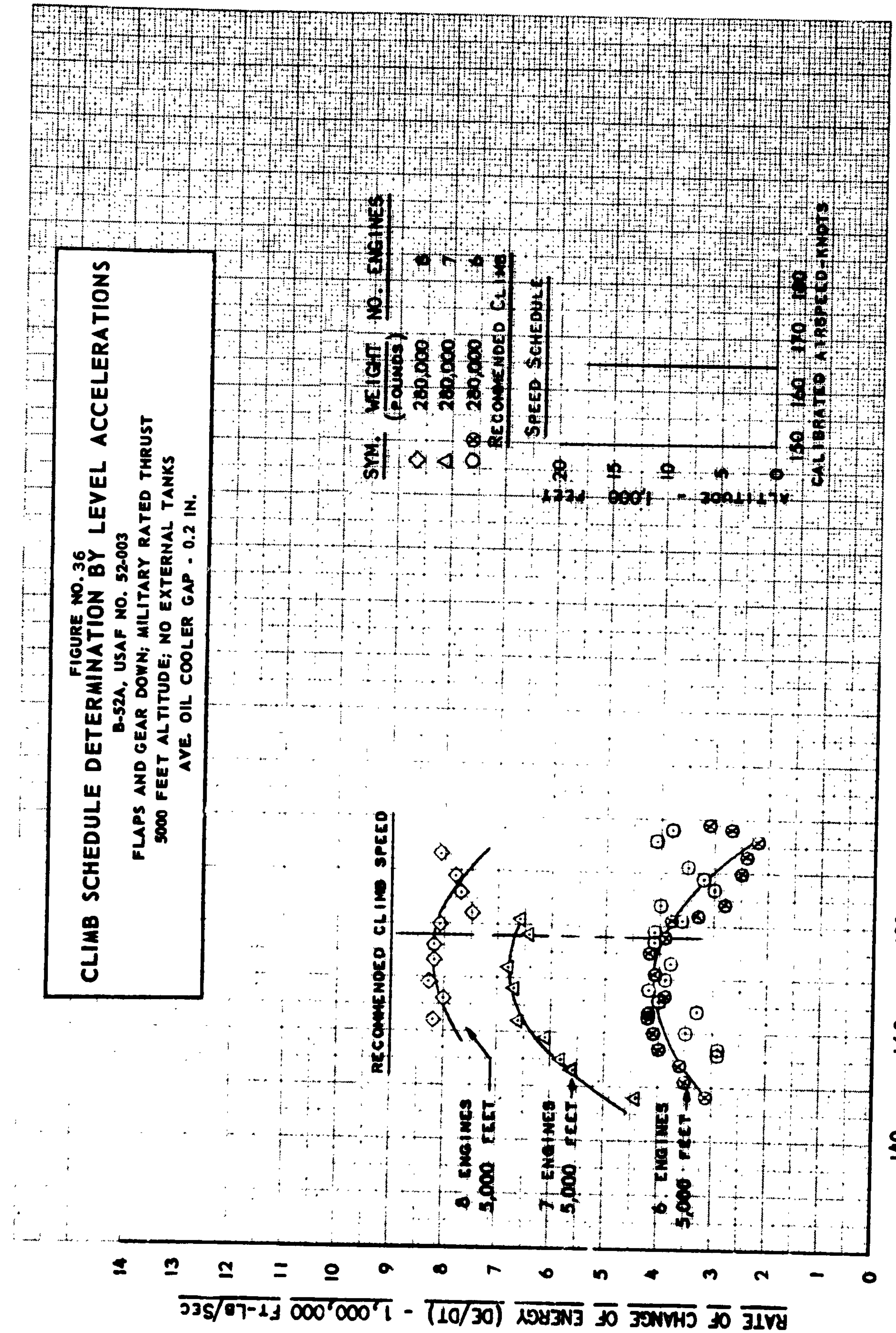


FIGURE NO. 36
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
FLAPS AND GEAR DOWN; MILITARY RATED THRUST
5000 FEET ALTITUDE; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

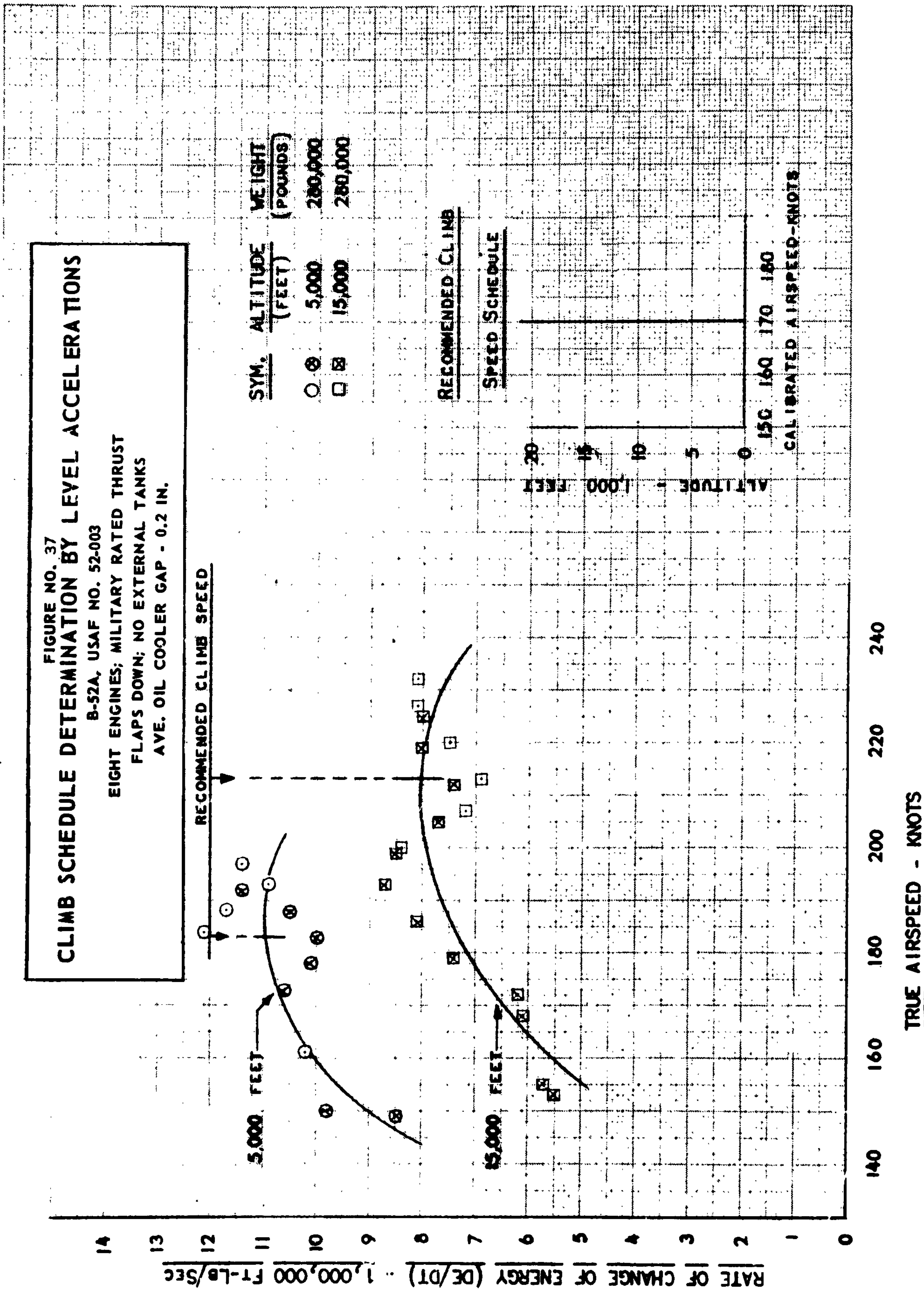


FIGURE NO. 37
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
EIGHT ENGINES; MILITARY RATED THRUST
FLAPS DOWN; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

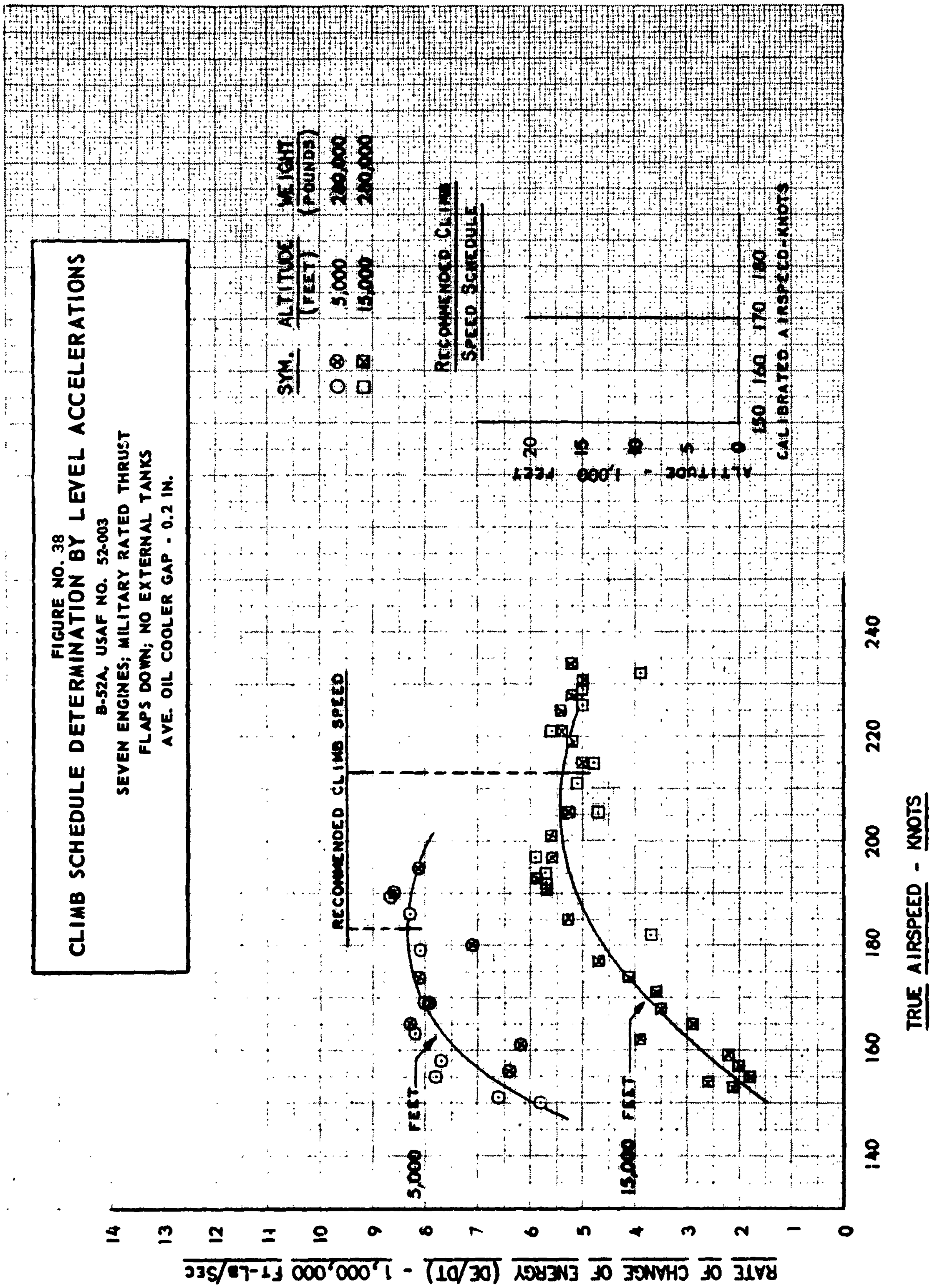


FIGURE NO. 38
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
SEVEN ENGINES; MILITARY RATED THRUST
FLAPS DOWN; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

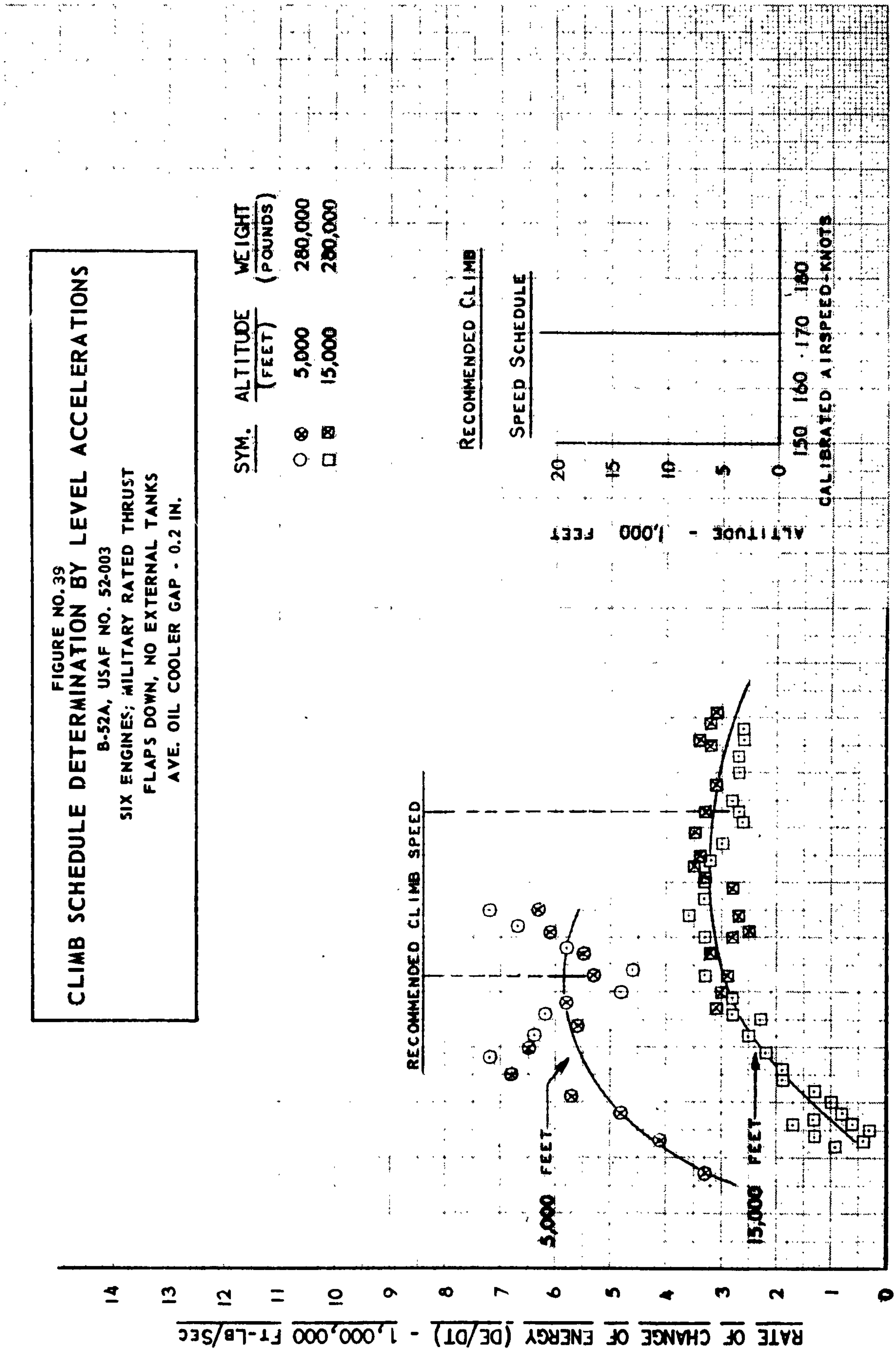


FIGURE NO. 39
CLIMB SCHEDULE DETERMINATION BY LEVEL ACCELERATIONS
B-52A, USAF NO. 52-003
SIX ENGINES; MILITARY RATED THRUST
FLAPS DOWN, NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

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FOR CONVENIENCE OF

PRESENTING PLOTS

RANGE DATA

FIGURE NO. 41

MAXIMUM TRUE AIRSPEED IN LEVEL FLIGHT

B-52A, USAF 52-003

AVE. OIL COOLER GAP 0.2 INCHES

MILITARY RATED POWER

NOTE: 1. PARAMETERS OF GROSS WEIGHT ARE NOTED IN THOUSANDS OF POUNDS
2. GROSS WEIGHT NOTED AT EACH TEST POINT
3. SLOPES OF EXTRAPOLATED PORTION OF CURVES BASED ON BOEING PREDICTED DATA
4. O CLEAN
● 2-1,000 GAL. EXTERNAL WING TANKS

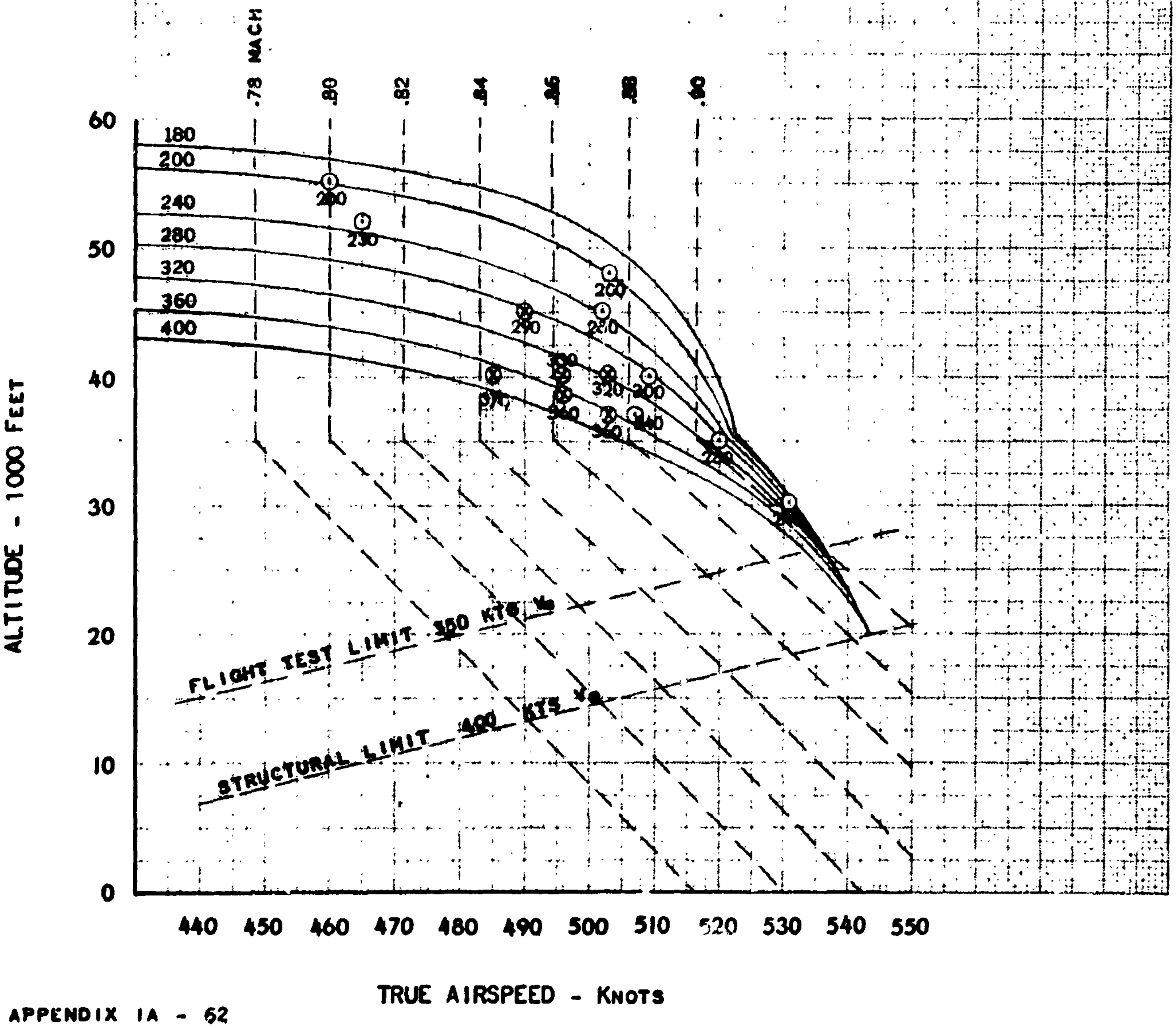


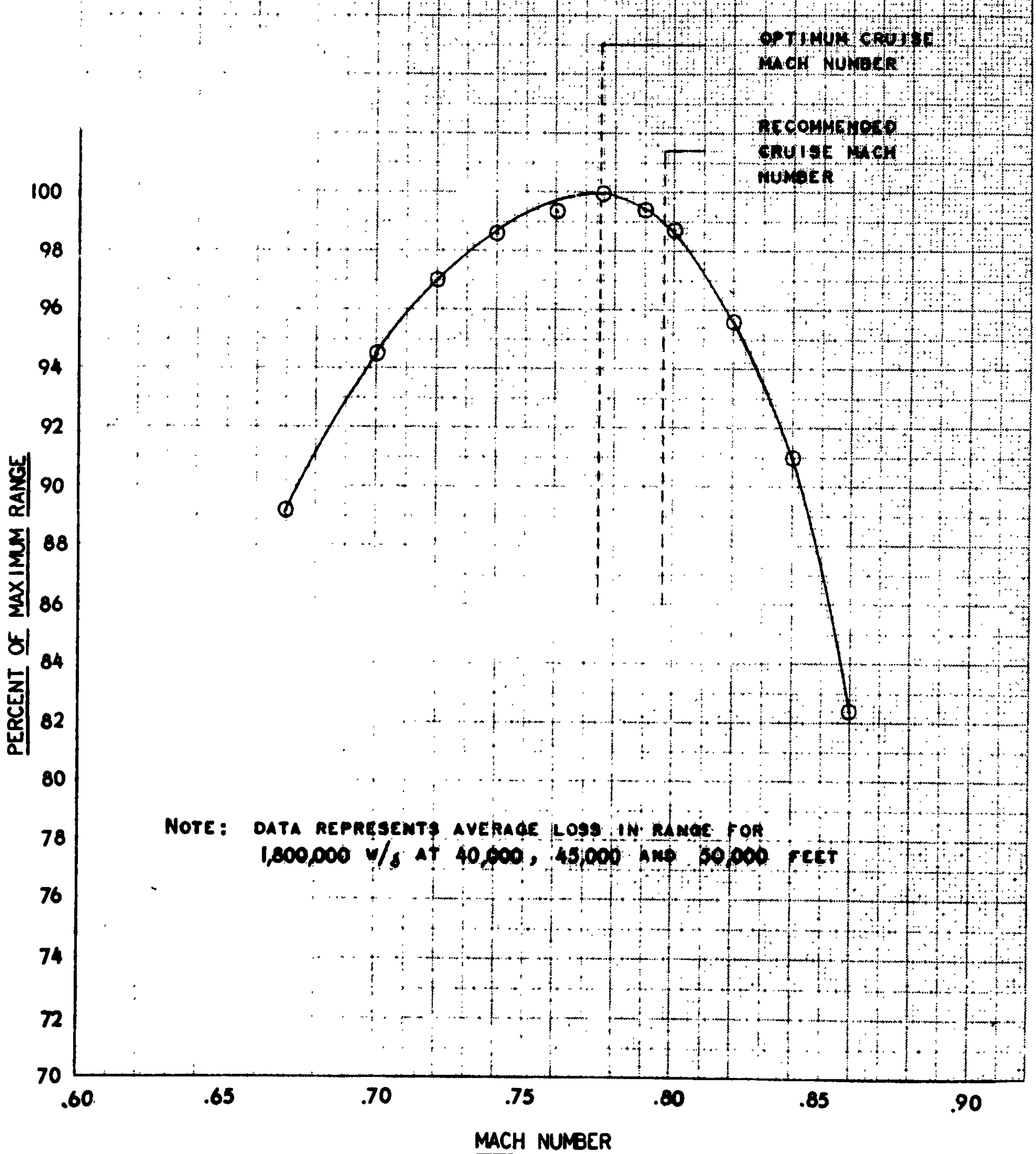
FIGURE NO. 42

EFFECT OF SPEED ON MAXIMUM RANGE

B52-A, USAF NO. 52-003

EIGHT ENGINES, NO EXTERNAL TANKS

W/δ - 1,800,000 POUNDS



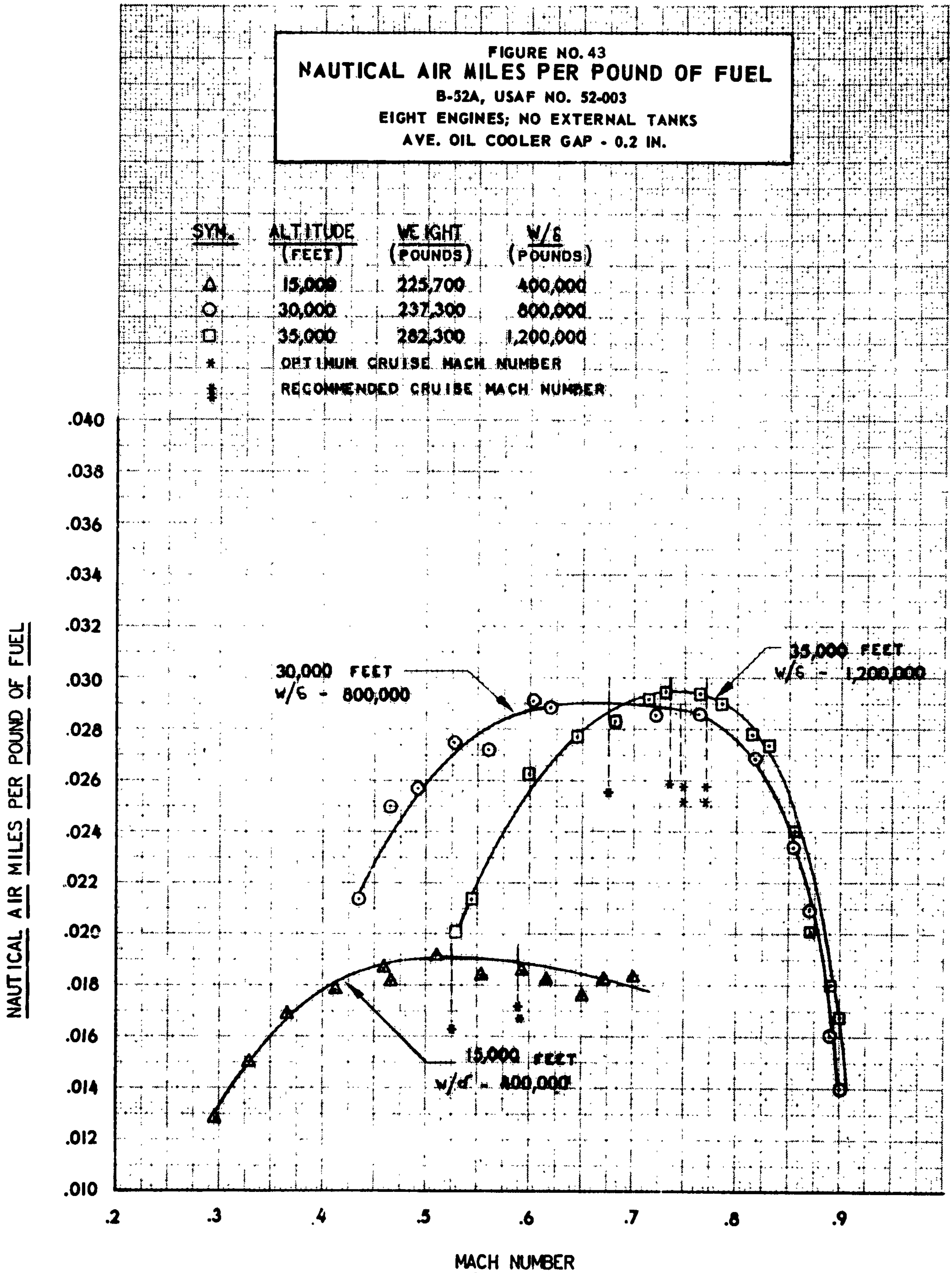


FIGURE NO. 43
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
15,000
225,700
400,000
30,000
237,300
800,000
35,000
282,300
1,200,000
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
30,000 FEET
W/δ - 800,000
35,000 FEET
W/δ - 1,200,000
15,000 FEET
W/δ - 400,000
NAUTICAL AIR MILES PER POUND OF FUEL
MACH NUMBER
.040
.038
.036
.034
.032
.030
.028
.026
.024
.022
.020
.018
.016
.014
.012
.010
.2
.3
.4
.5
.6
.7
.8
.9

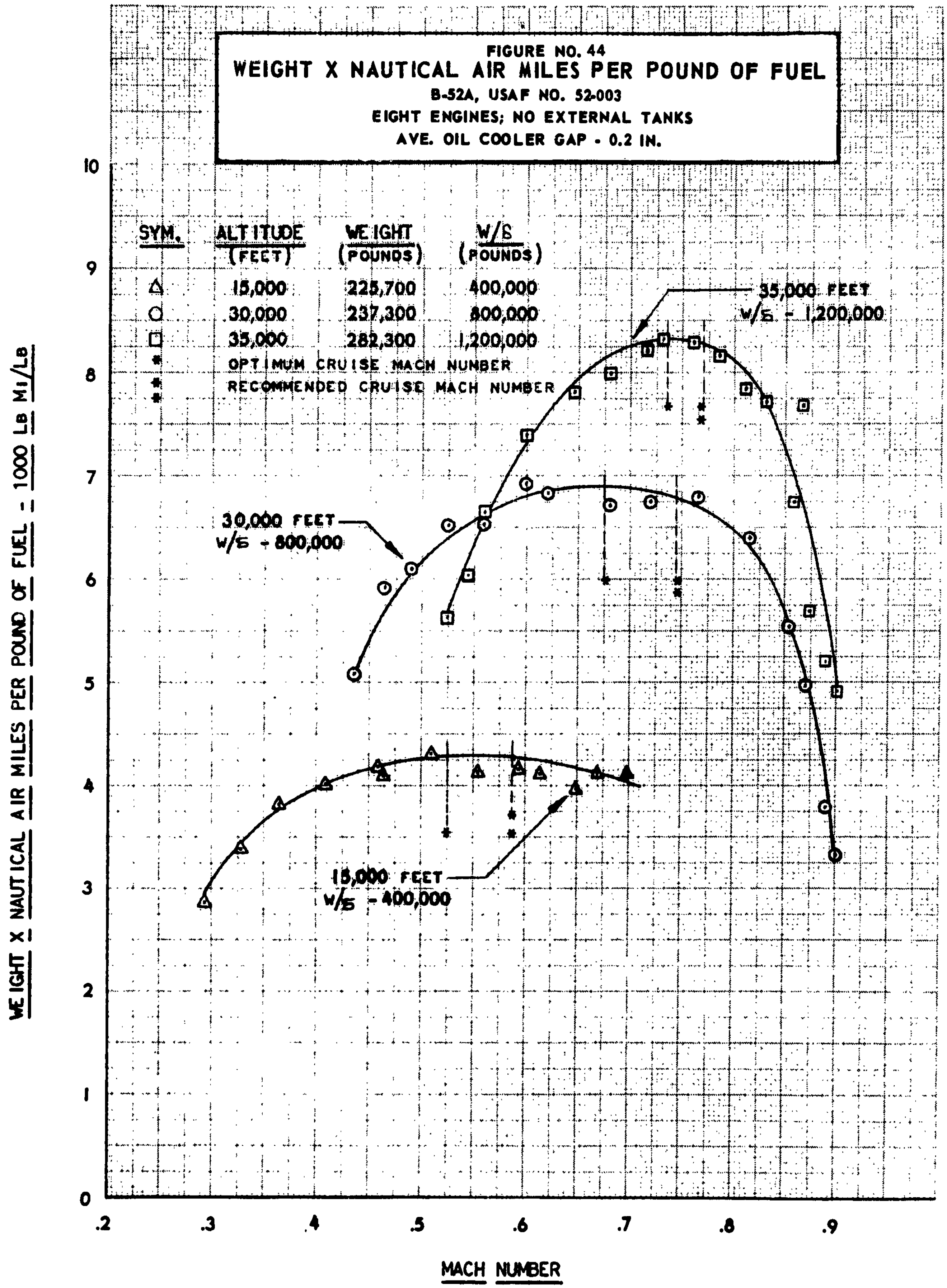


FIGURE NO. 44
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
15,000
225,700
400,000
30,000
237,300
800,000
35,000
282,300
1,200,000
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
35,000 FEET
W/δ - 1,200,000
30,000 FEET
W/δ - 800,000
15,000 FEET
W/δ - 400,000
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL - 1000 LB MI/LB
MACH NUMBER
0
1
2
3
4
5
6
7
8
9
10
.2
.3
.4
.5
.6
.7
.8
.9

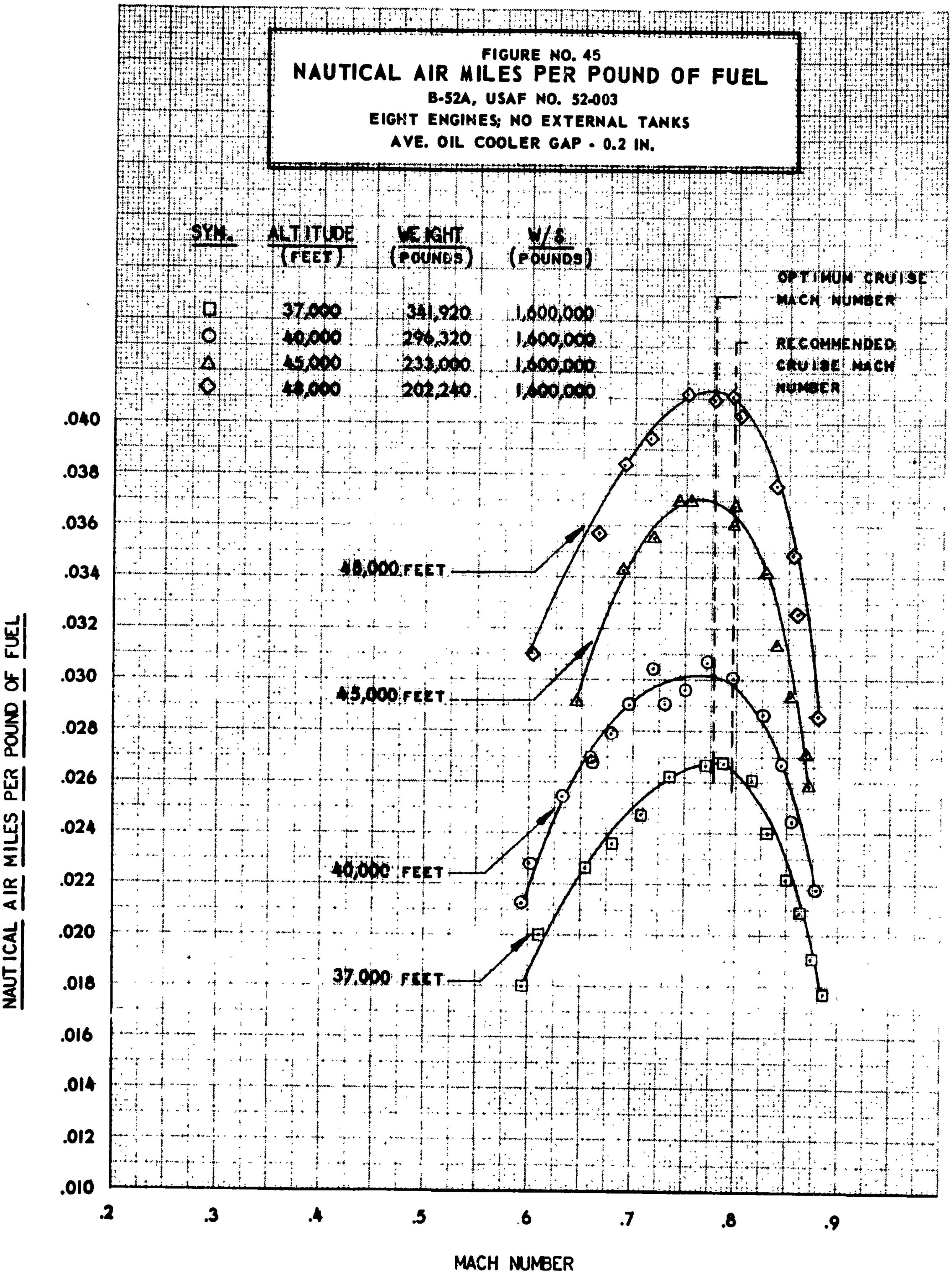


FIGURE NO. 45
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
37,000
341,920
1,600,000
40,000
296,320
1,600,000
45,000
233,000
1,600,000
48,000
202,240
1,600,000
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
48,000 FEET
45,000 FEET
40,000 FEET
37,000 FEET
NAUTICAL AIR MILES PER POUND OF FUEL
.040
.038
.036
.034
.032
.030
.028
.026
.024
.022
.020
.018
.016
.014
.012
.010
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

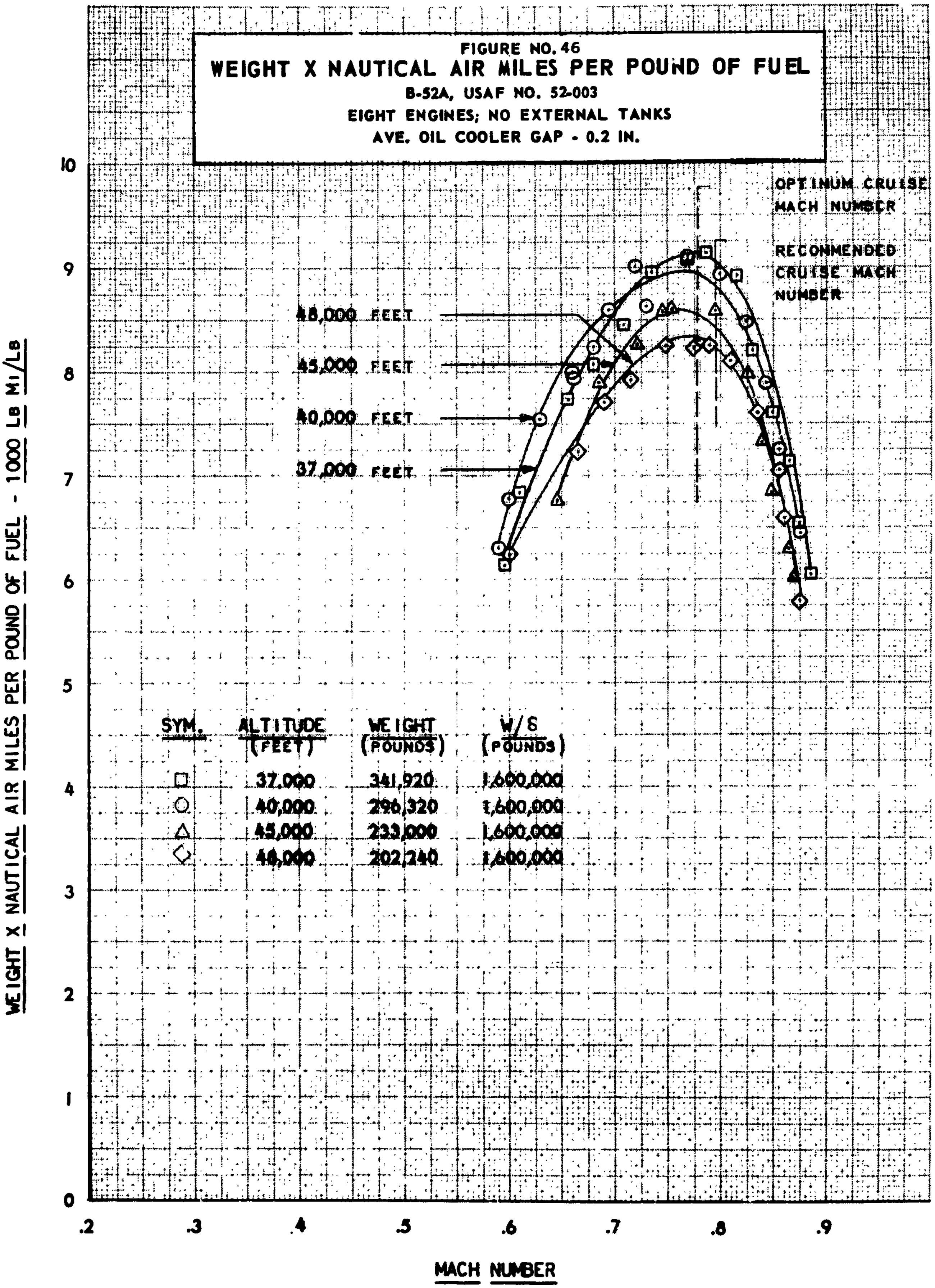


FIGURE NO. 46
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
48,000 FEET
45,000 FEET
40,000 FEET
37,000 FEET
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
□ 37,000 341,920 1,600,000
○ 40,000 296,320 1,600,000
△ 45,000 233,000 1,600,000
◇ 48,000 202,240 1,600,000
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL - 1000 LB MI/LB
0
1
2
3
4
5
6
7
8
9
10
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

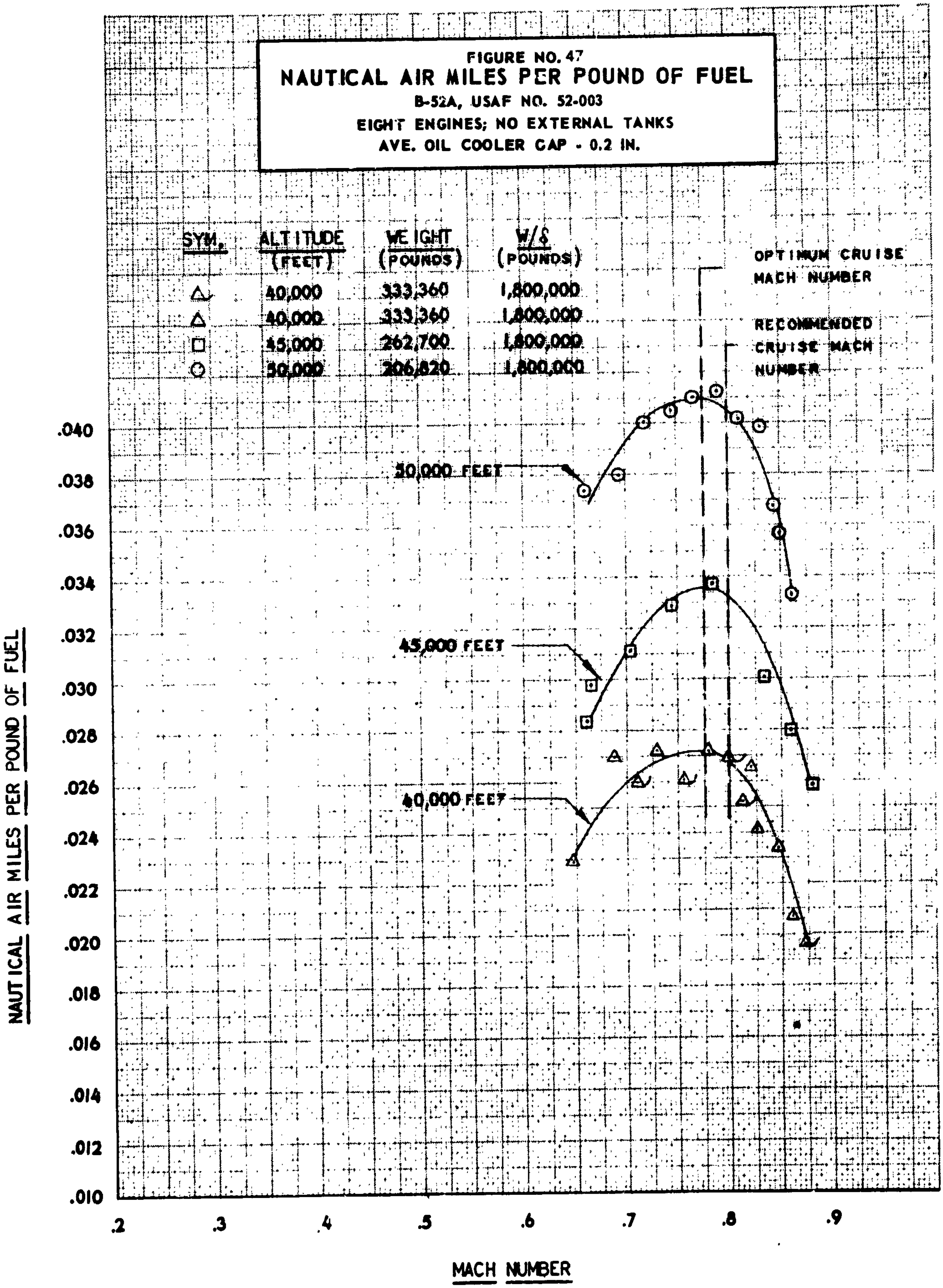


FIGURE NO. 47
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
40,000 333,360 1,800,000
40,000 333,360 1,800,000
45,000 262,700 1,800,000
50,000 206,820 1,800,000
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
50,000 FEET
45,000 FEET
40,000 FEET
.040
.038
.036
.034
.032
.030
.028
.026
.024
.022
.020
.018
.016
.014
.012
.010
.2
.3
.4
.5
.6
.7
.8
.9
NAUTICAL AIR MILES PER POUND OF FUEL
MACH NUMBER

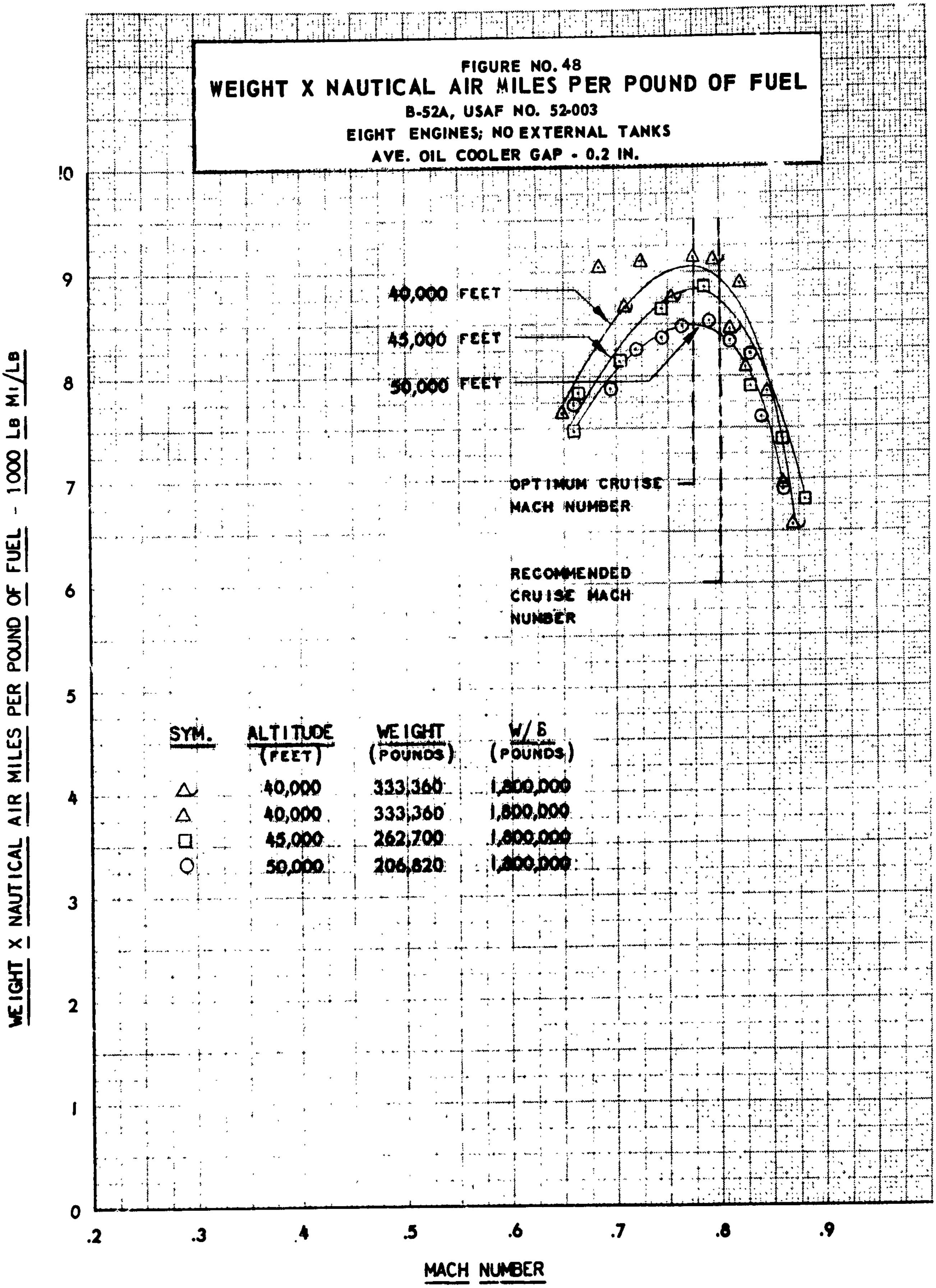


FIGURE NO. 48
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
40,000 FEET
45,000 FEET
50,000 FEET
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL - 1000 LB MI/LB
MACH NUMBER
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
40,000 333,360 1,800,000
40,000 333,360 1,800,000
45,000 262,700 1,800,000
50,000 206,820 1,800,000

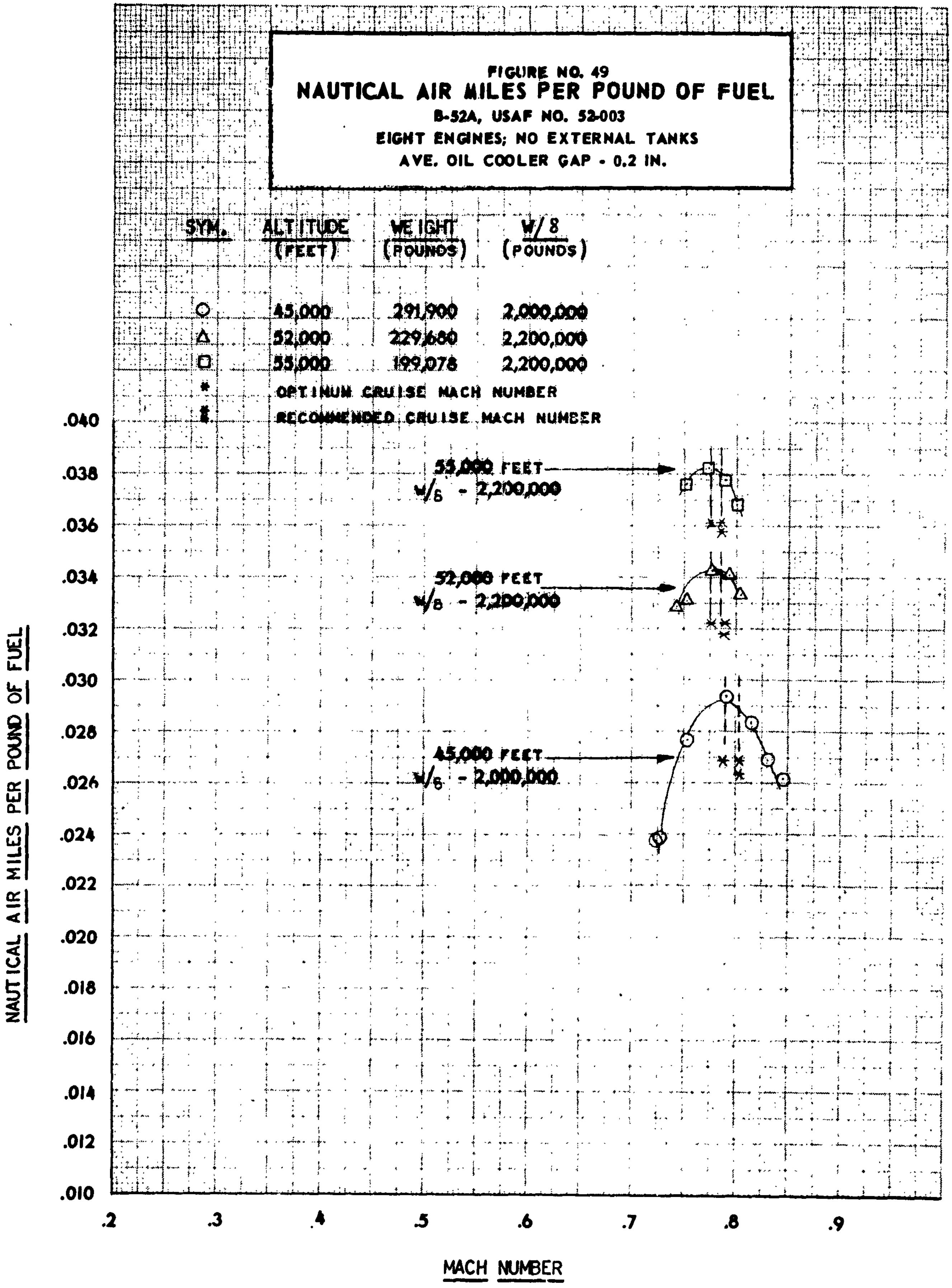


FIGURE NO. 49
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
45,000
291,900
2,000,000
52,000
229,680
2,200,000
55,000
199,078
2,200,000
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
55,000 FEET
W/δ - 2,200,000
52,000 FEET
W/δ - 2,200,000
45,000 FEET
W/δ - 2,000,000
NAUTICAL AIR MILES PER POUND OF FUEL
.040
.038
.036
.034
.032
.030
.028
.026
.024
.022
.020
.018
.016
.014
.012
.010
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

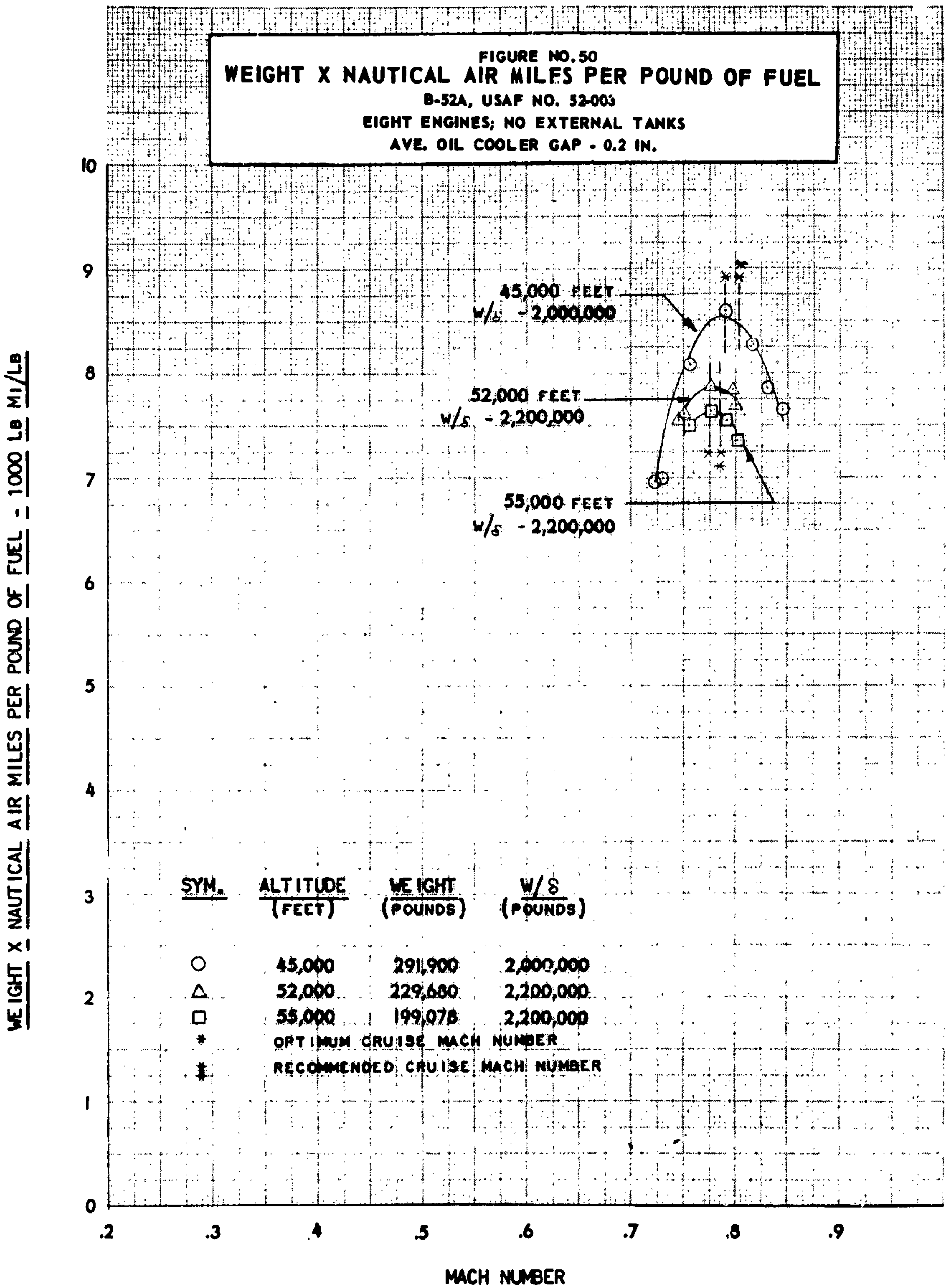


FIGURE NO. 50
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
45,000 FEET
W/δ - 2,000,000
52,000 FEET
W/δ - 2,200,000
55,000 FEET
W/δ - 2,200,000
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
45,000
291,900
2,000,000
52,000
229,680
2,200,000
55,000
199,078
2,200,000
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL - 1000 LB MI/LB
MACH NUMBER
0
1
2
3
4
5
6
7
8
9
10
.2
.3
.4
.5
.6
.7
.8
.9

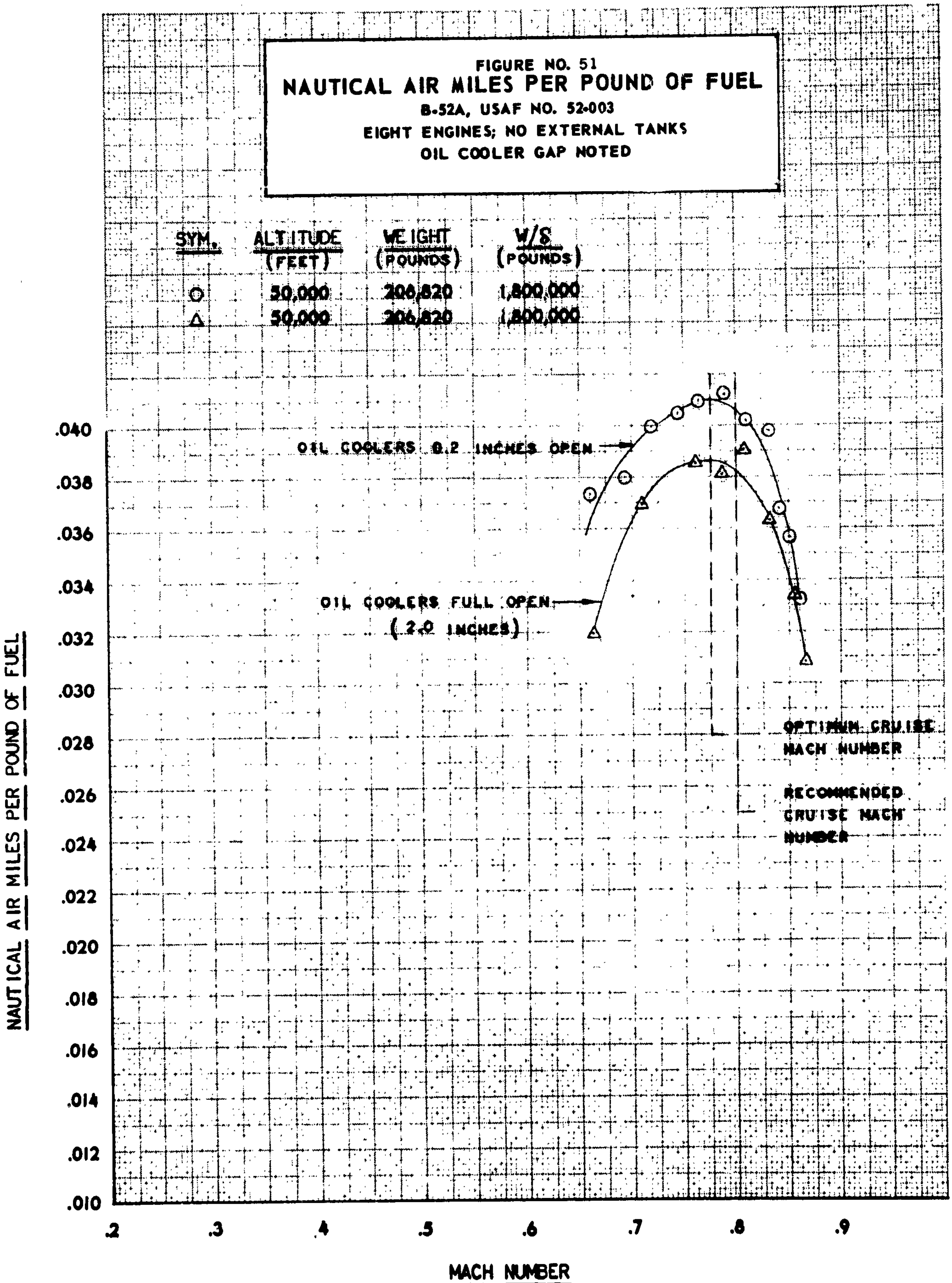


FIGURE NO. 51
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
OIL COOLER GAP NOTED
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
○ 50,000 206,820 1,800,000
△ 50,000 206,820 1,800,000
OIL COOLERS 0.2 INCHES OPEN
OIL COOLERS FULL OPEN (2.0 INCHES)
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
NAUTICAL AIR MILES PER POUND OF FUEL
MACH NUMBER
.040
.038
.036
.034
.032
.030
.028
.026
.024
.022
.020
.018
.016
.014
.012
.010
.2
.3
.4
.5
.6
.7
.8
.9

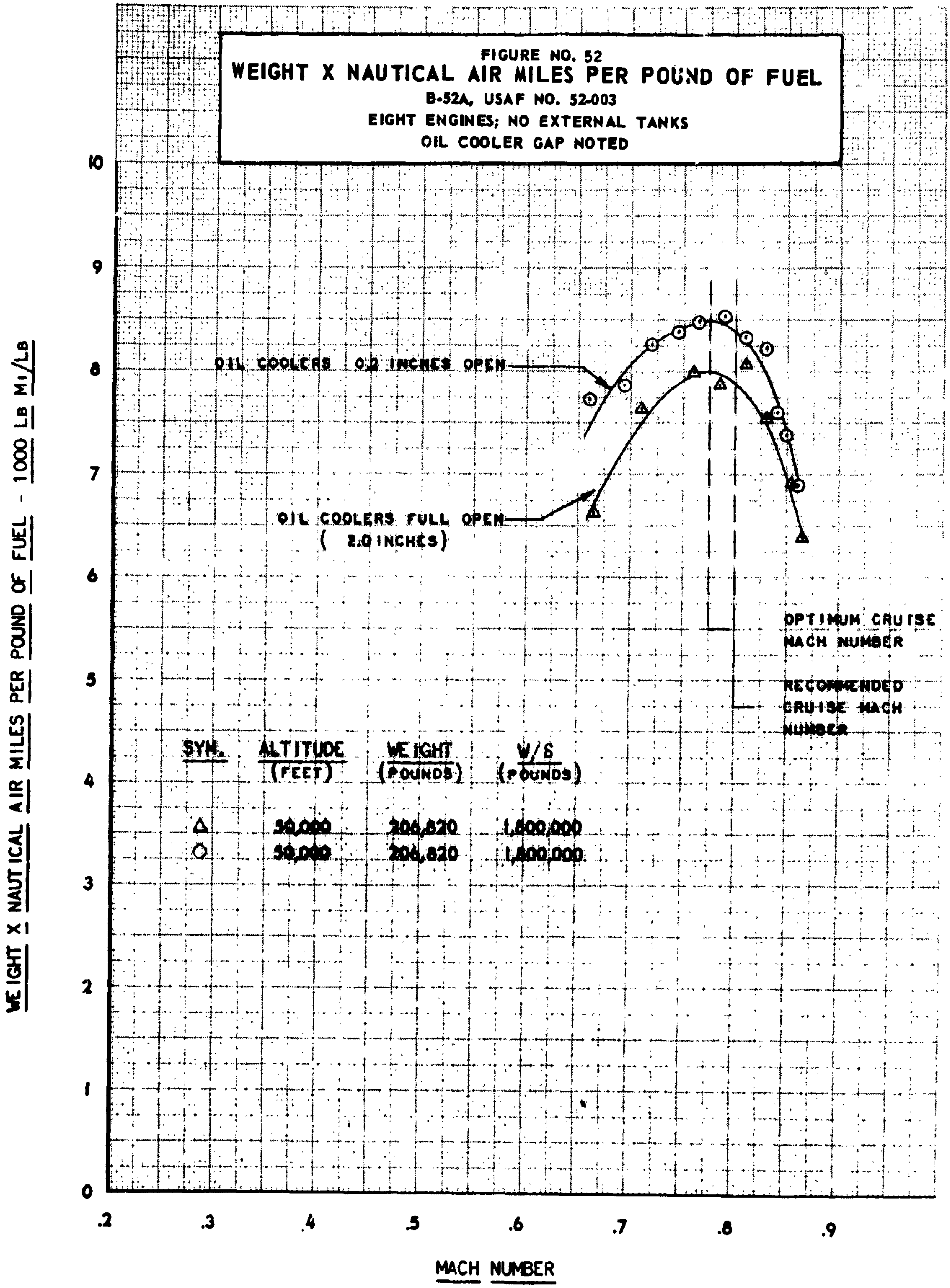


FIGURE NO. 52
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
OIL COOLER GAP NOTED

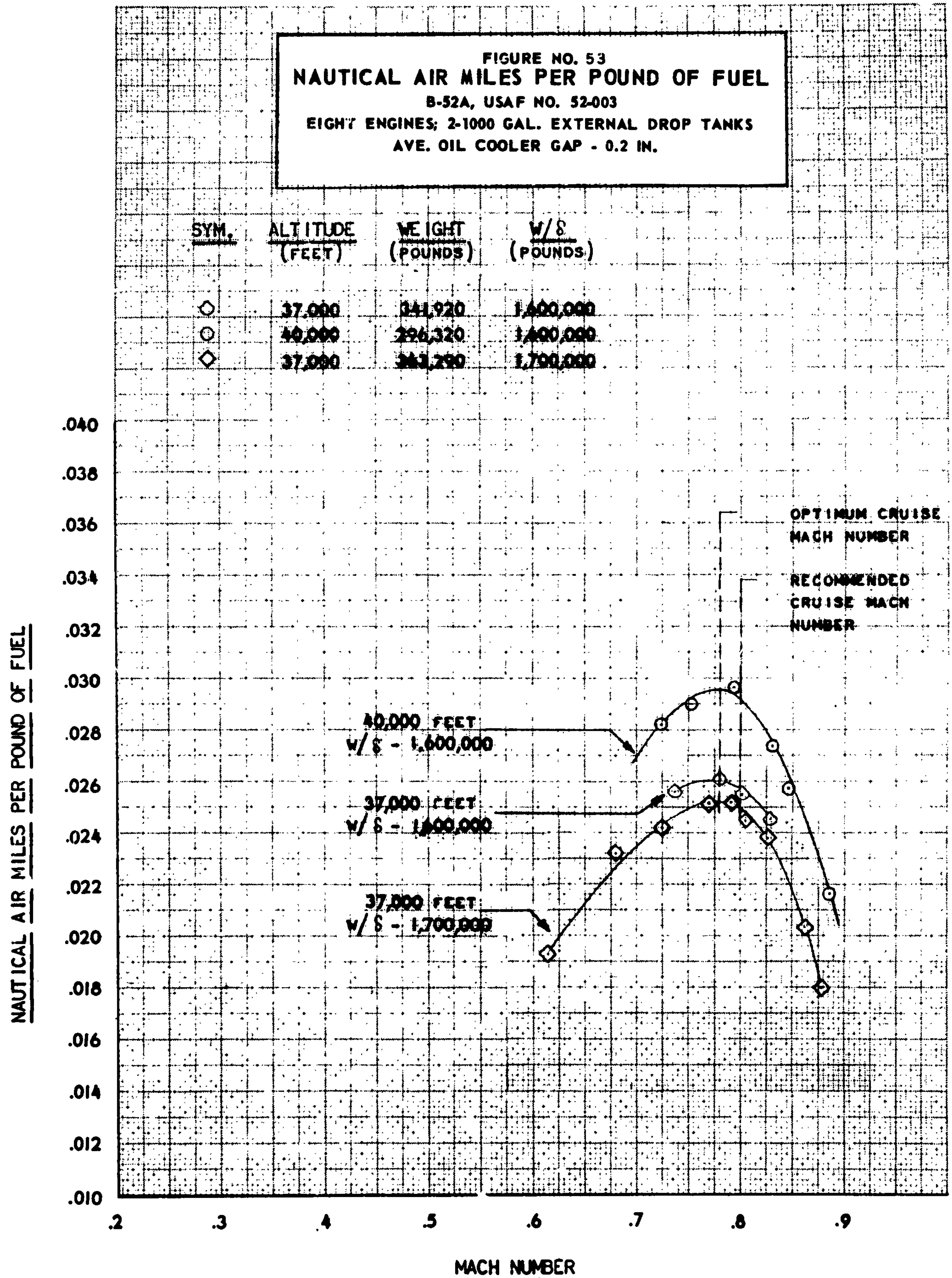


FIGURE NO. 53
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; 2-1000 GAL. EXTERNAL DROP TANKS
AVE. OIL COOLER GAP - 0.2 IN.

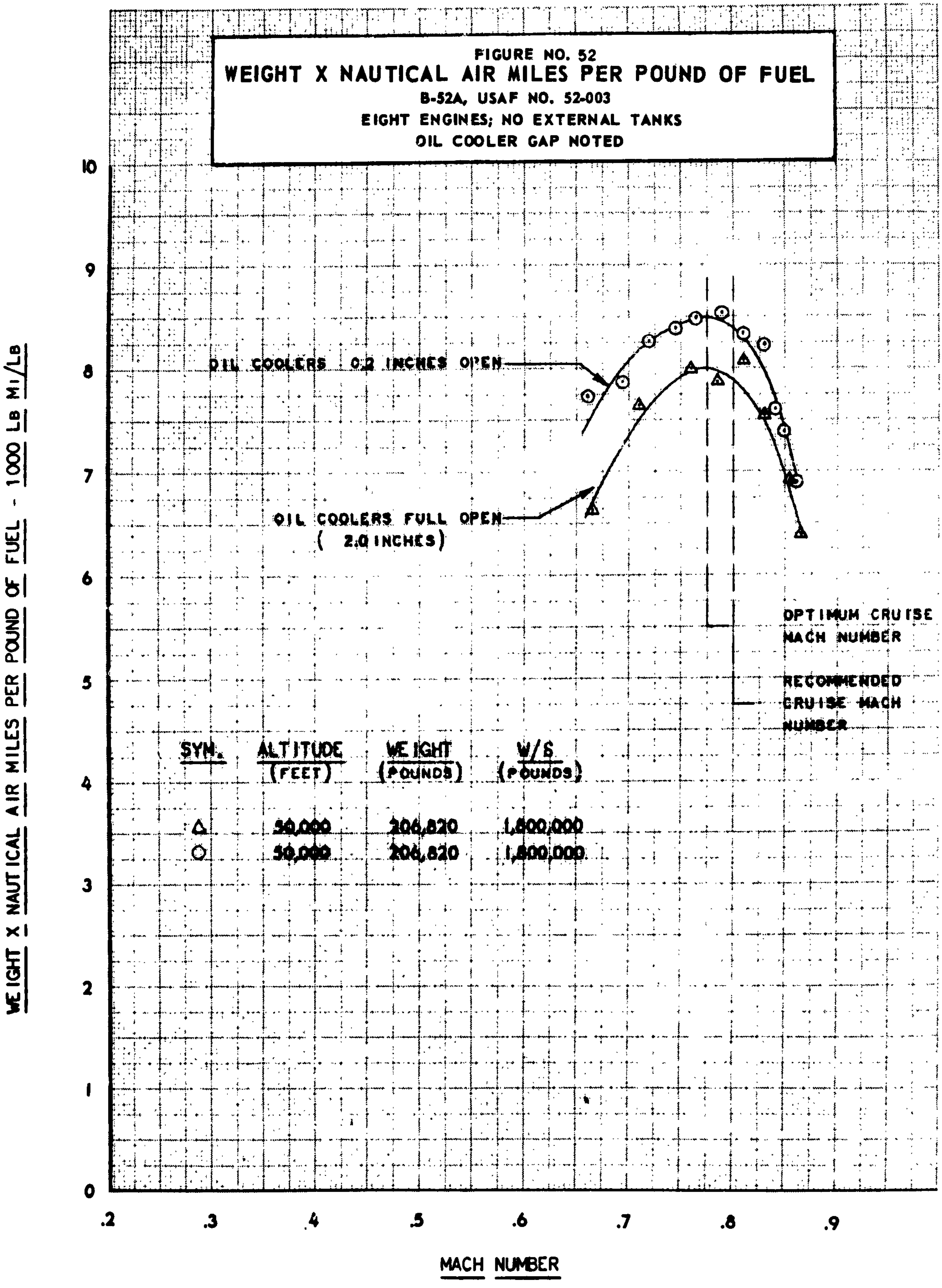


FIGURE NO. 52
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
OIL COOLER GAP NOTED
OIL COOLERS 0.2 INCHES OPEN
OIL COOLERS FULL OPEN
(2.0 INCHES)
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
△ 50,000 206,820 1,800,000
○ 50,000 206,820 1,800,000
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL - 1000 LB MI/LB
MACH NUMBER
0
1
2
3
4
5
6
7
8
9
10
.2
.3
.4
.5
.6
.7
.8
.9

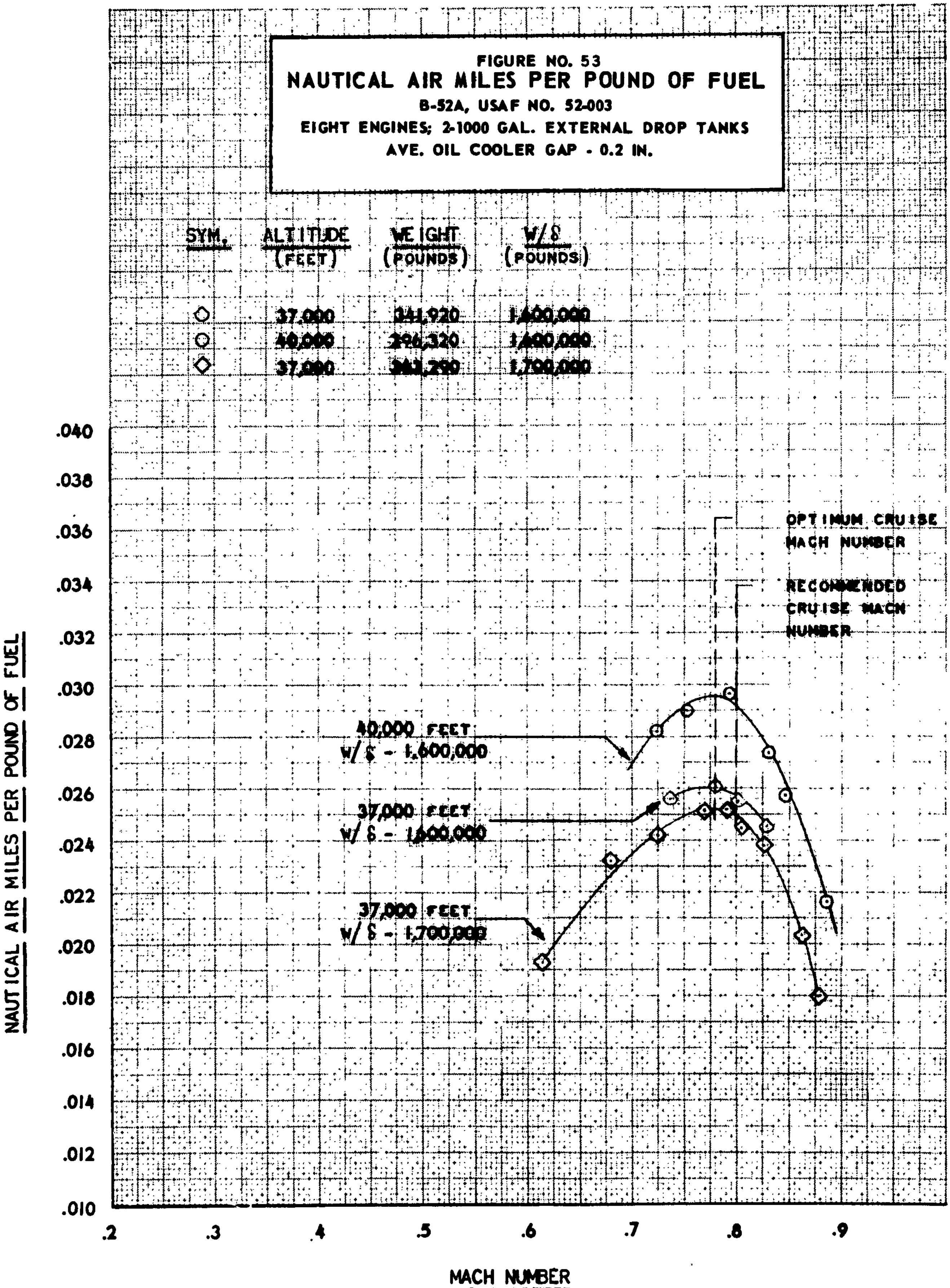


FIGURE NO. 53
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; 2-1000 GAL. EXTERNAL DROP TANKS
AVE. OIL COOLER GAP - 0.2 IN.

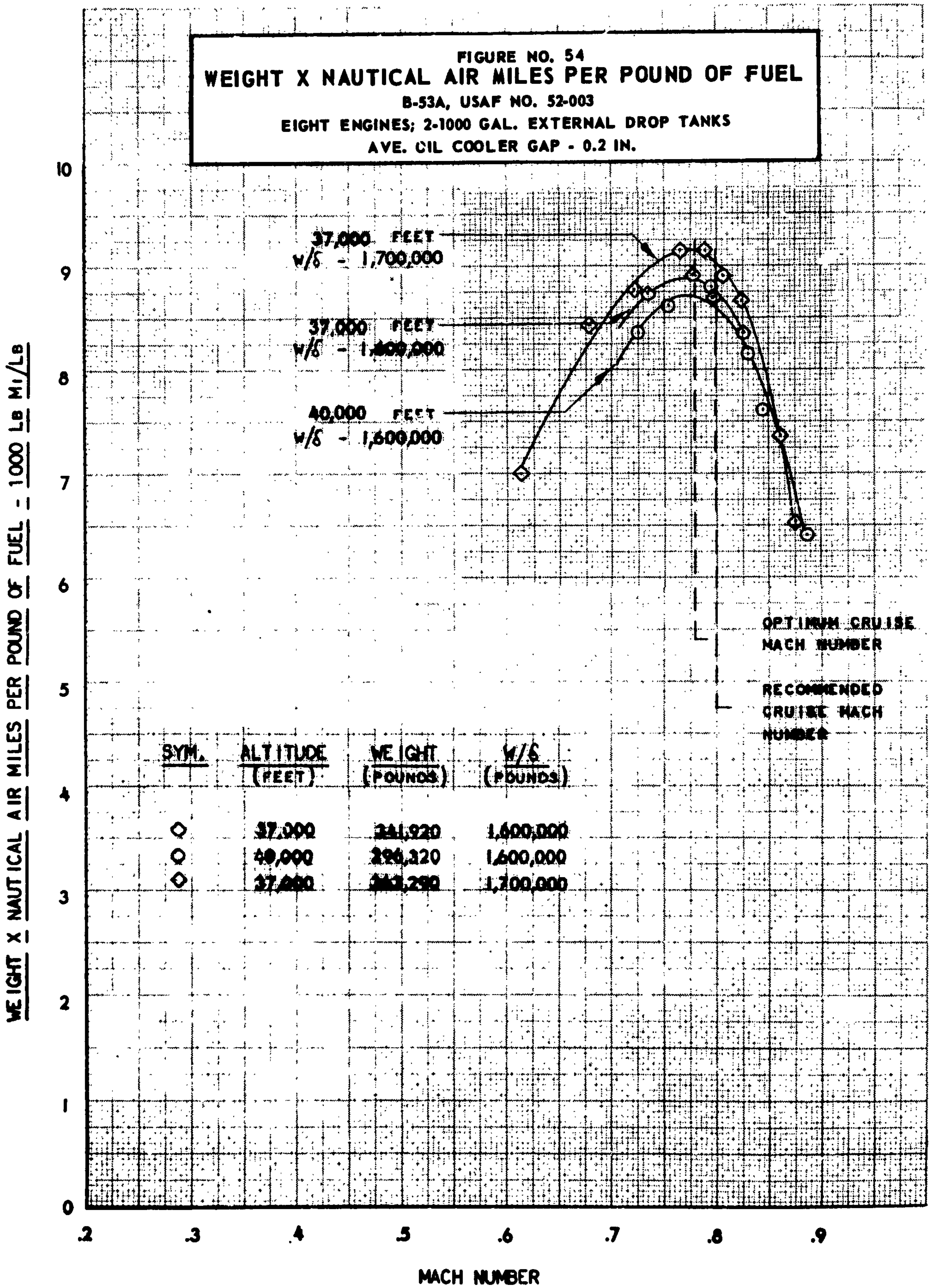


FIGURE NO. 54
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-53A, USAF NO. 52-003
EIGHT ENGINES; 2-1000 GAL. EXTERNAL DROP TANKS
AVE. OIL COOLER GAP - 0.2 IN.

FIGURE NO. 55
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; 2-1000 GAL. EXTERNAL DROP TANKS
AVE. OIL COOLER GAP - 0.2 IN.

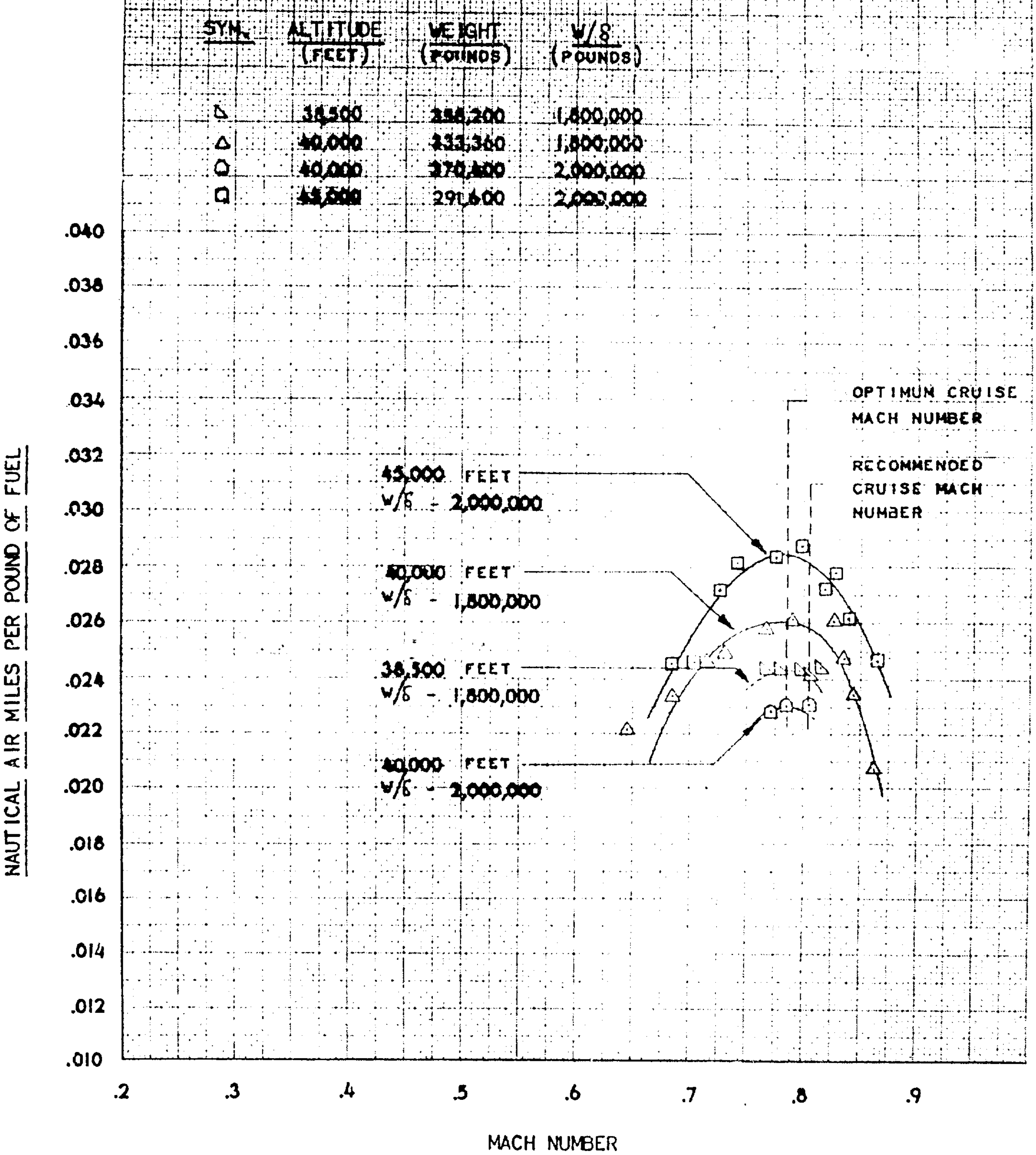


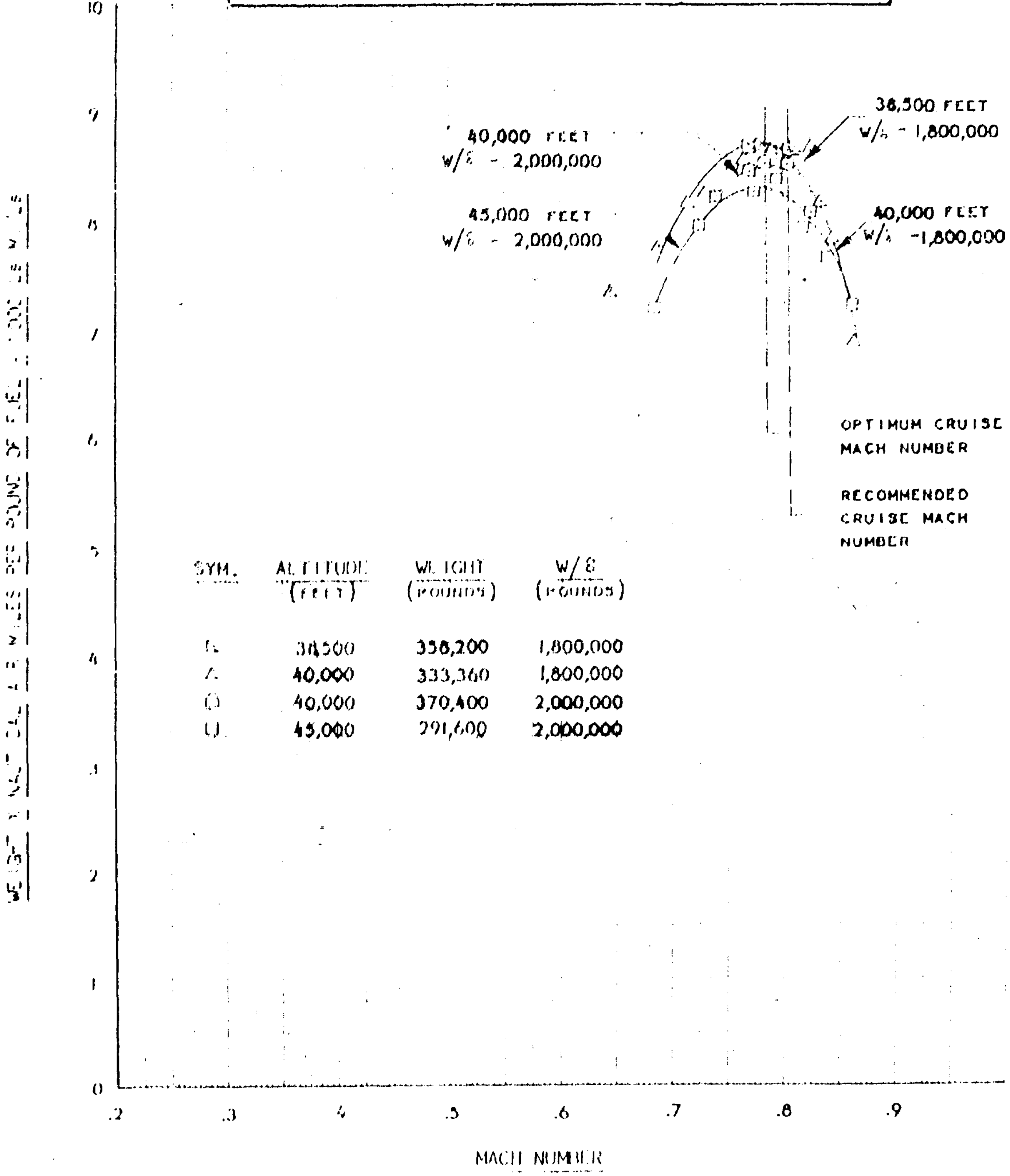
FIGURE NO. 56

WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL

B-52A, USAF NO. 52-003

EIGHT ENGINES; 2-1000 GAL. EXTERNAL DROP TANKS

AVE. OIL COOLER GAP - 0.2 IN.



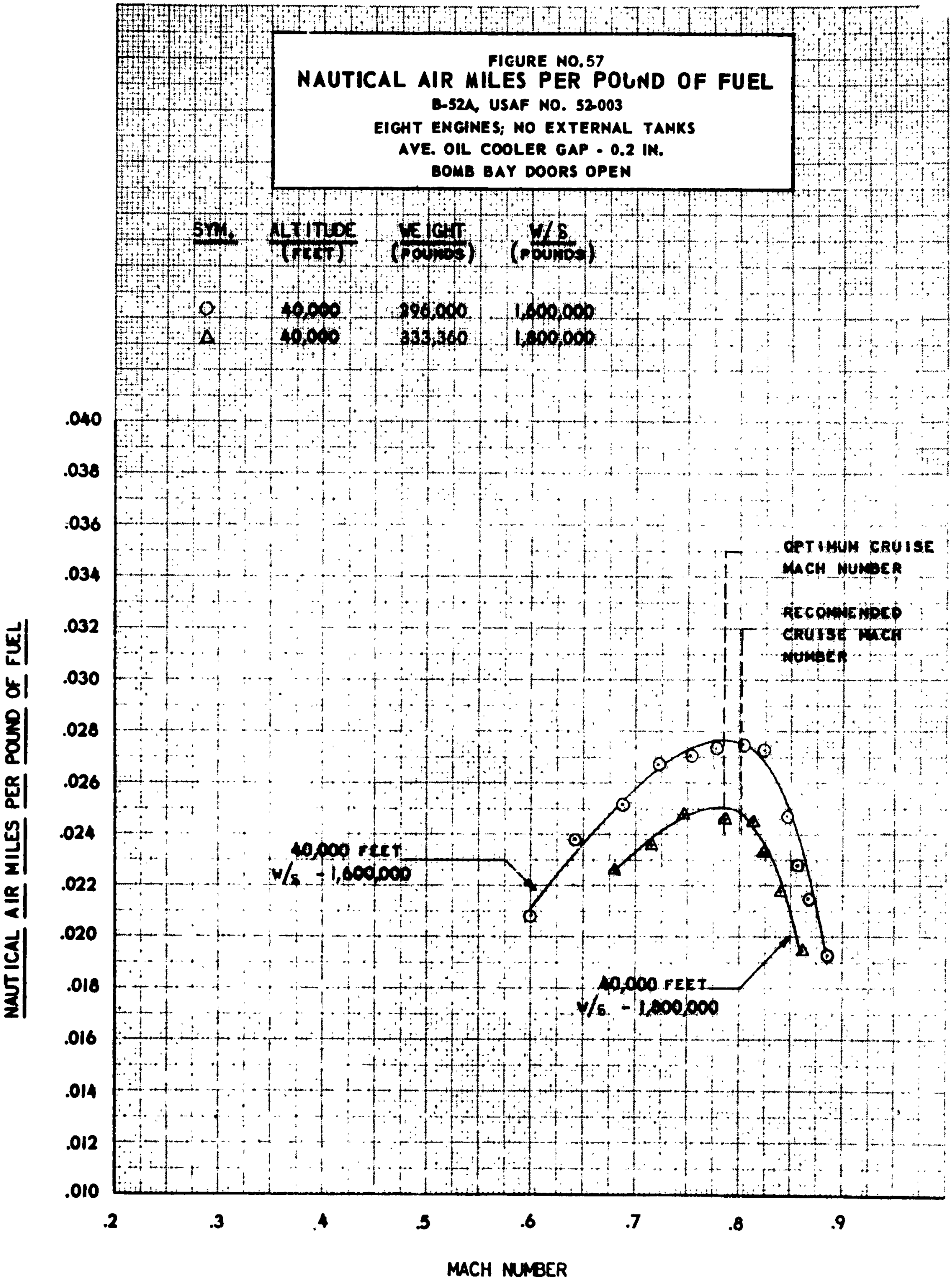


FIGURE NO. 57
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
BOMB BAY DOORS OPEN
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/S (POUNDS)
○ 40,000 296,000 1,600,000
△ 40,000 333,360 1,800,000
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
40,000 FEET W/S - 1,600,000
40,000 FEET W/S - 1,800,000
NAUTICAL AIR MILES PER POUND OF FUEL
.040
.038
.036
.034
.032
.030
.028
.026
.024
.022
.020
.018
.016
.014
.012
.010
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

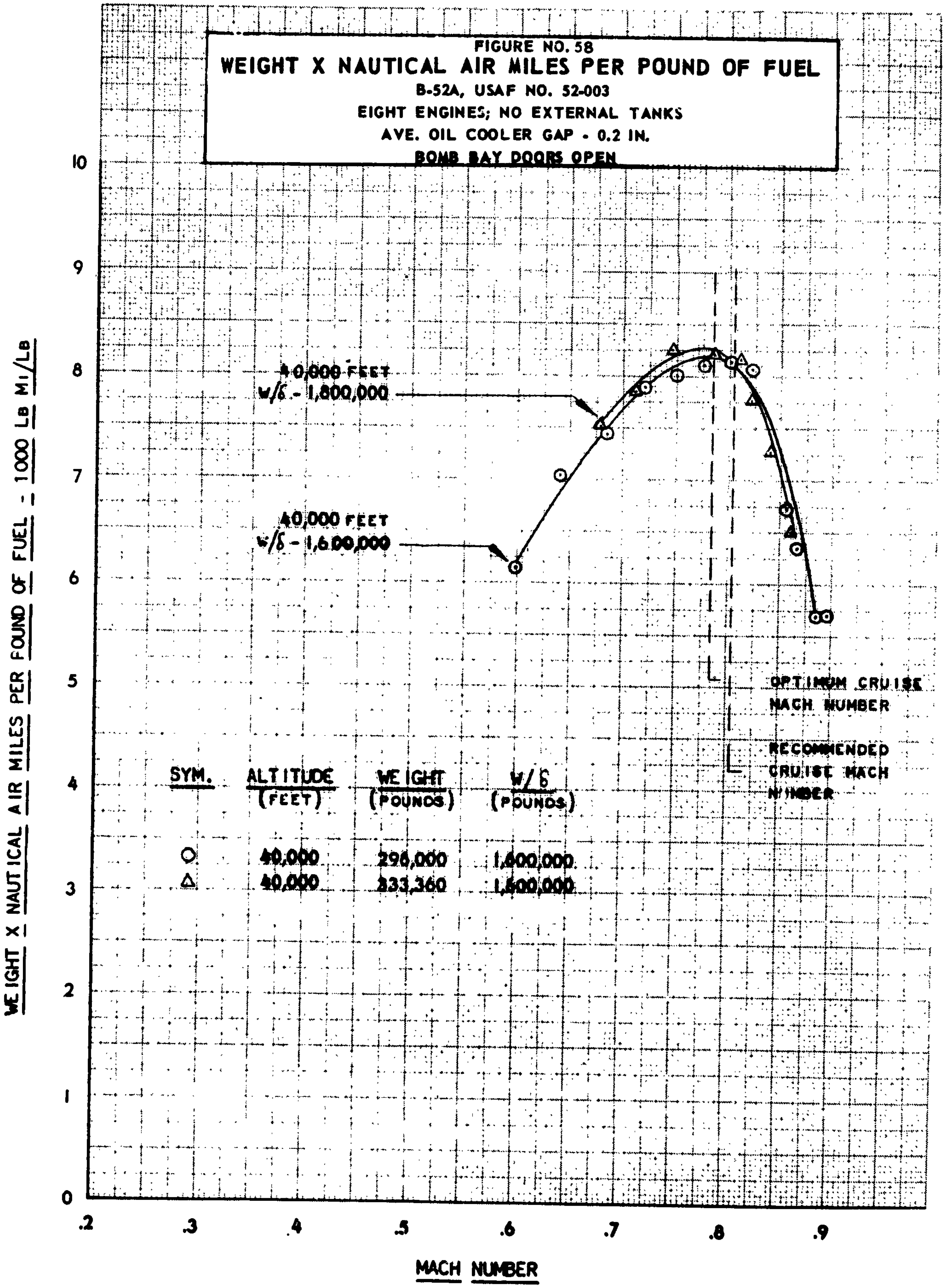


FIGURE NO. 58
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
BOMB BAY DOORS OPEN
40,000 FEET
W/δ - 1,800,000
40,000 FEET
W/δ - 1,600,000
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
○ 40,000 296,000 1,600,000
△ 40,000 333,360 1,800,000
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL - 1000 LB MI/LB
MACH NUMBER
0
1
2
3
4
5
6
7
8
9
10
.2
.3
.4
.5
.6
.7
.8
.9

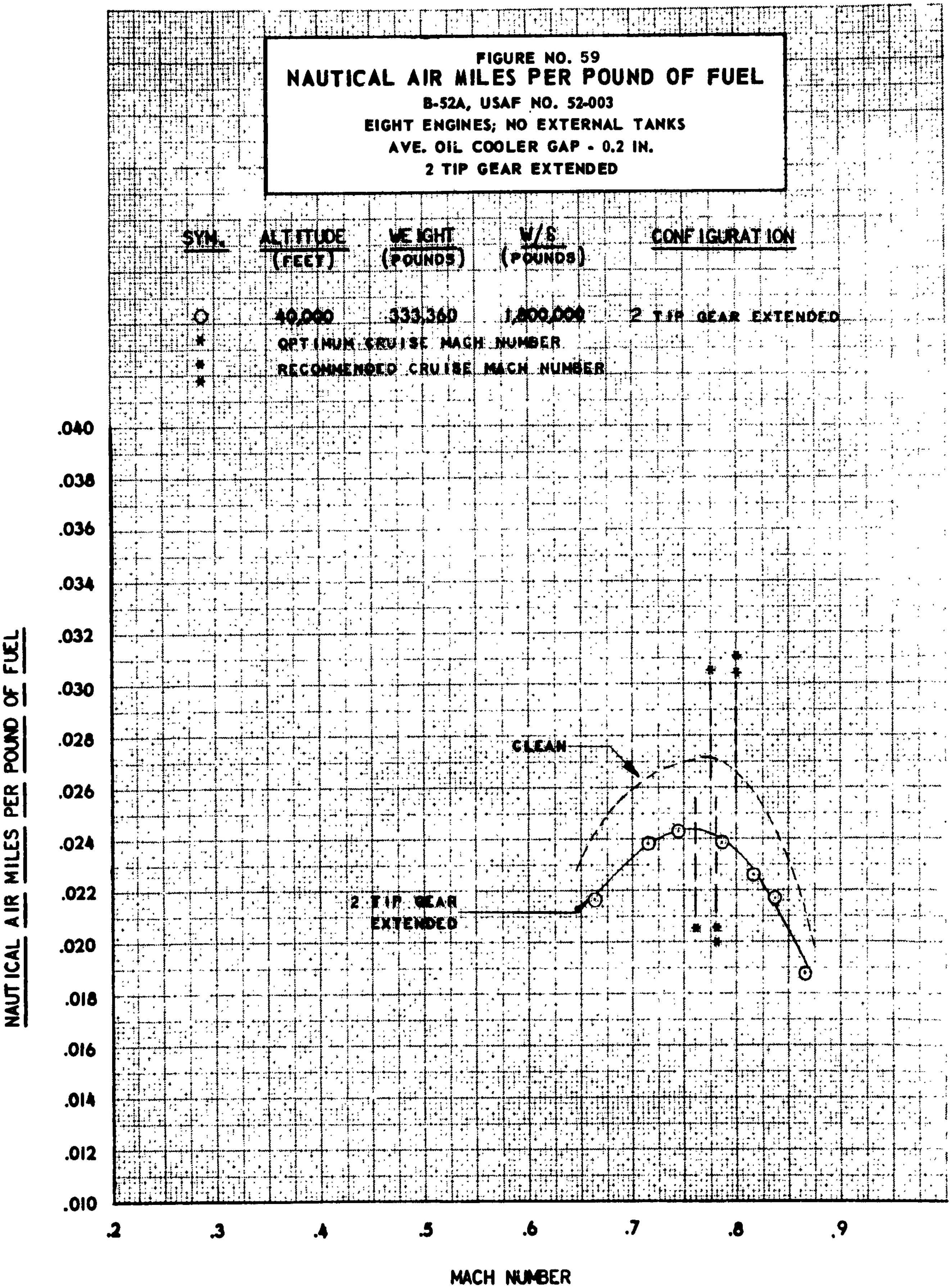
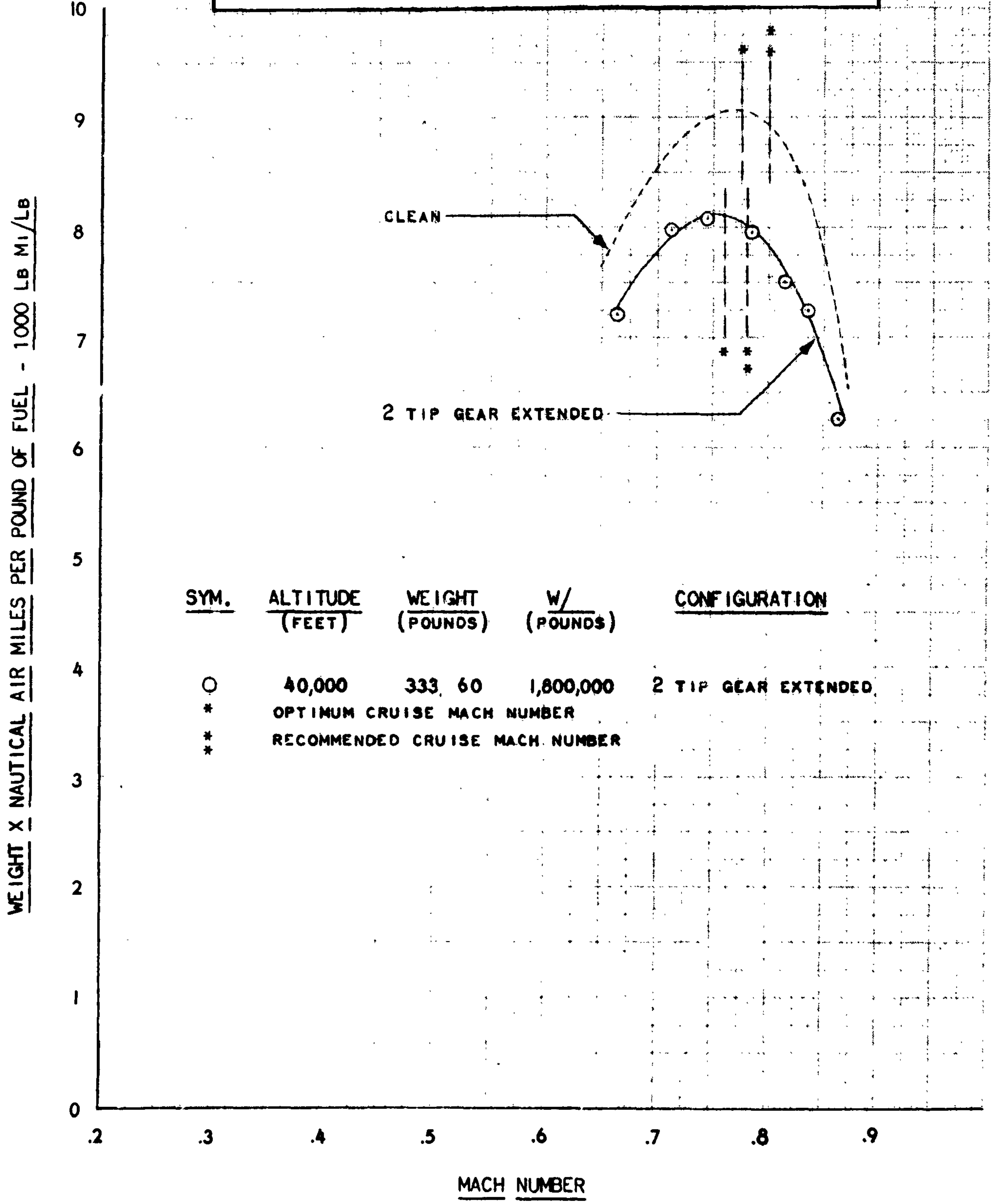


FIGURE NO. 59
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
2 TIP GEAR EXTENDED
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/S (POUNDS)
CONFIGURATION
40,000
333,360
1,800,000
2 TIP GEAR EXTENDED
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
CLEAN
2 TIP GEAR EXTENDED
NAUTICAL AIR MILES PER POUND OF FUEL
MACH NUMBER
.040
.038
.036
.034
.032
.030
.028
.026
.024
.022
.020
.018
.016
.014
.012
.010
.2
.3
.4
.5
.6
.7
.8
.9

FIGURE NO. 60
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
2 TIP GEAR EXTENDED



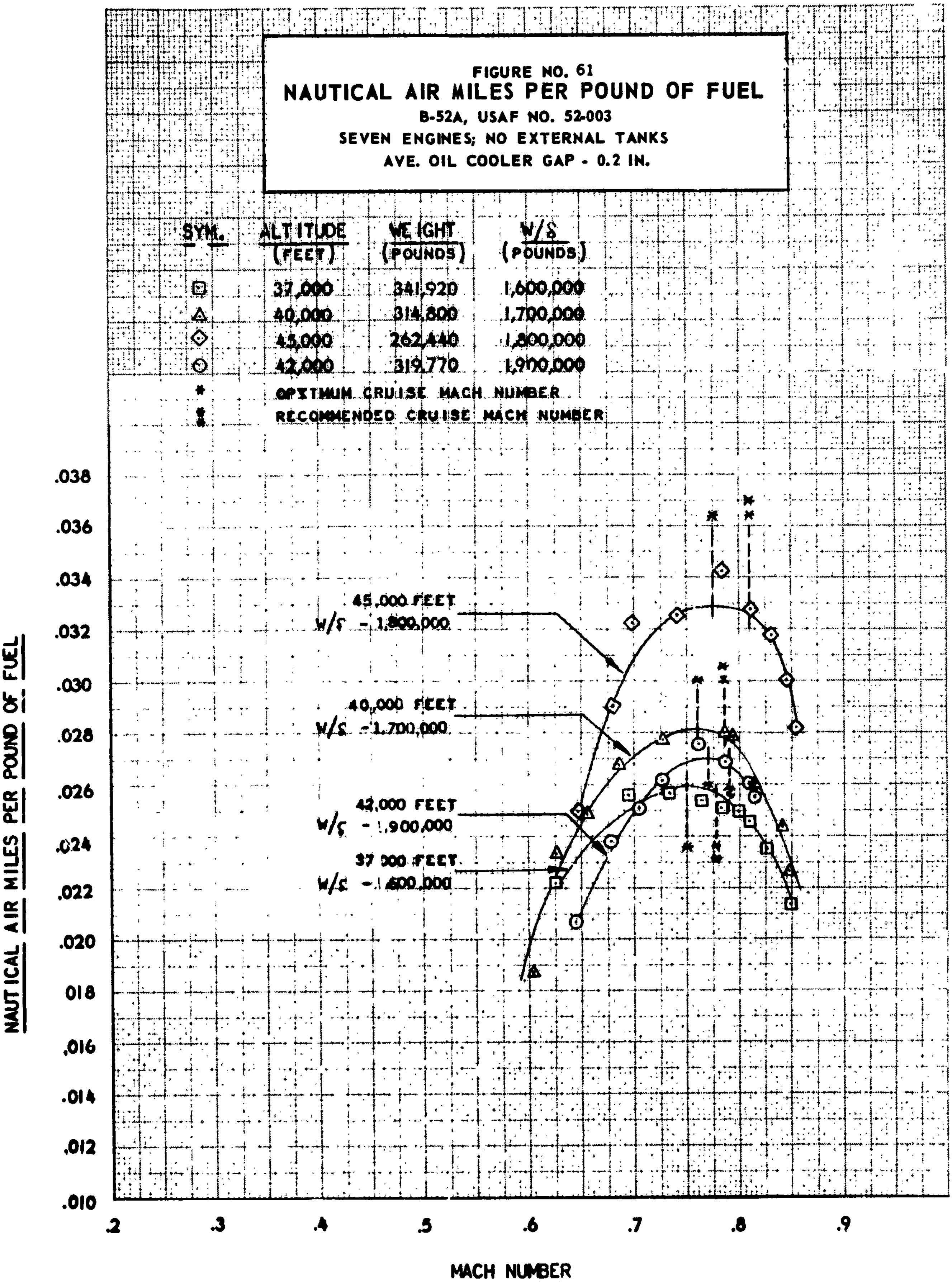


FIGURE NO. 61
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
SEVEN ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
37,000
341,920
1,600,000
40,000
314,800
1,700,000
45,000
262,440
1,800,000
42,000
319,770
1,900,000
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
45,000 FEET W/δ - 1,800,000
40,000 FEET W/δ - 1,700,000
42,000 FEET W/δ - 1,900,000
37,000 FEET W/δ - 1,600,000
.038
.036
.034
.032
.030
.028
.026
.024
.022
.020
.018
.016
.014
.012
.010
NAUTICAL AIR MILES PER POUND OF FUEL
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

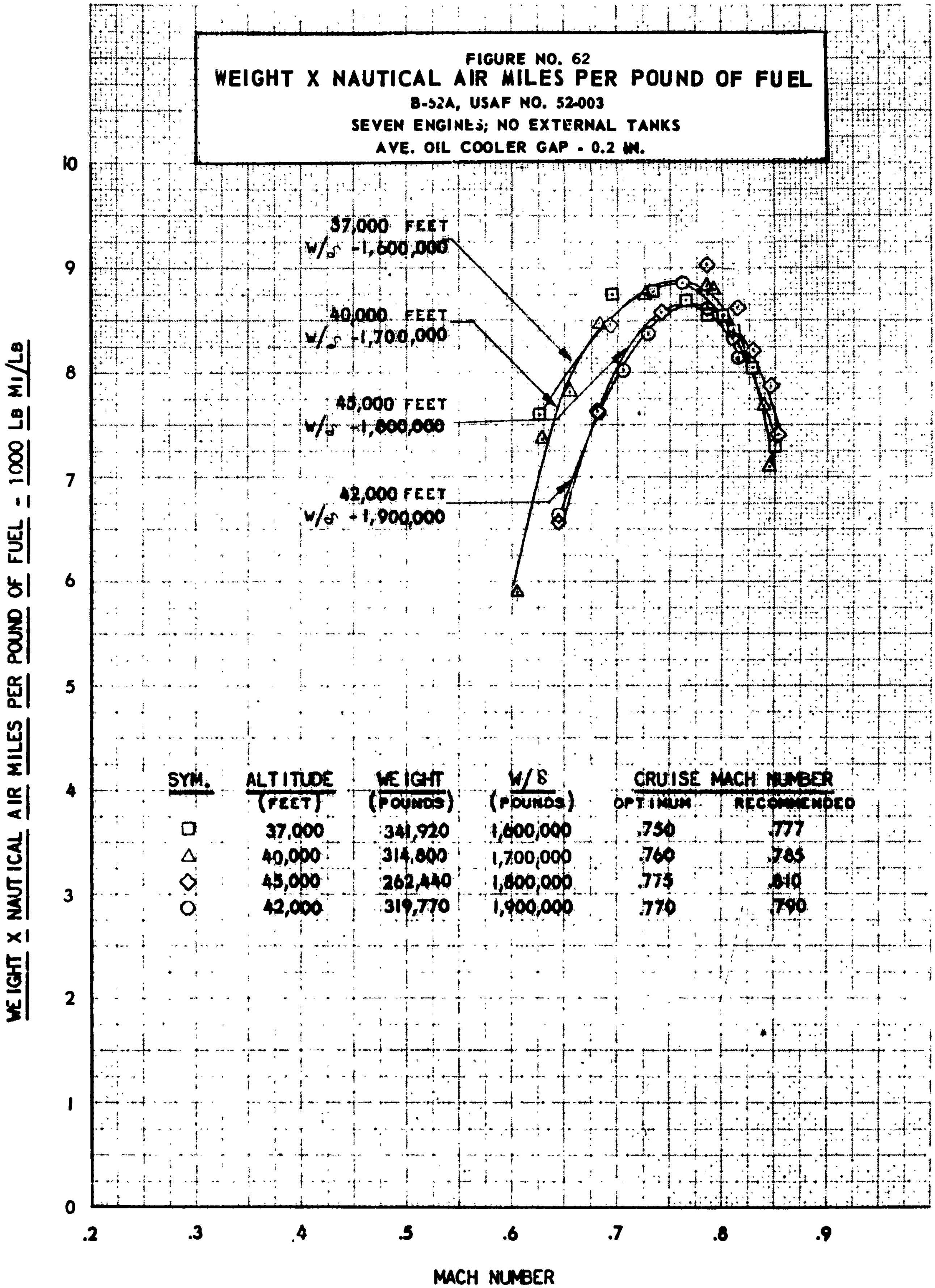
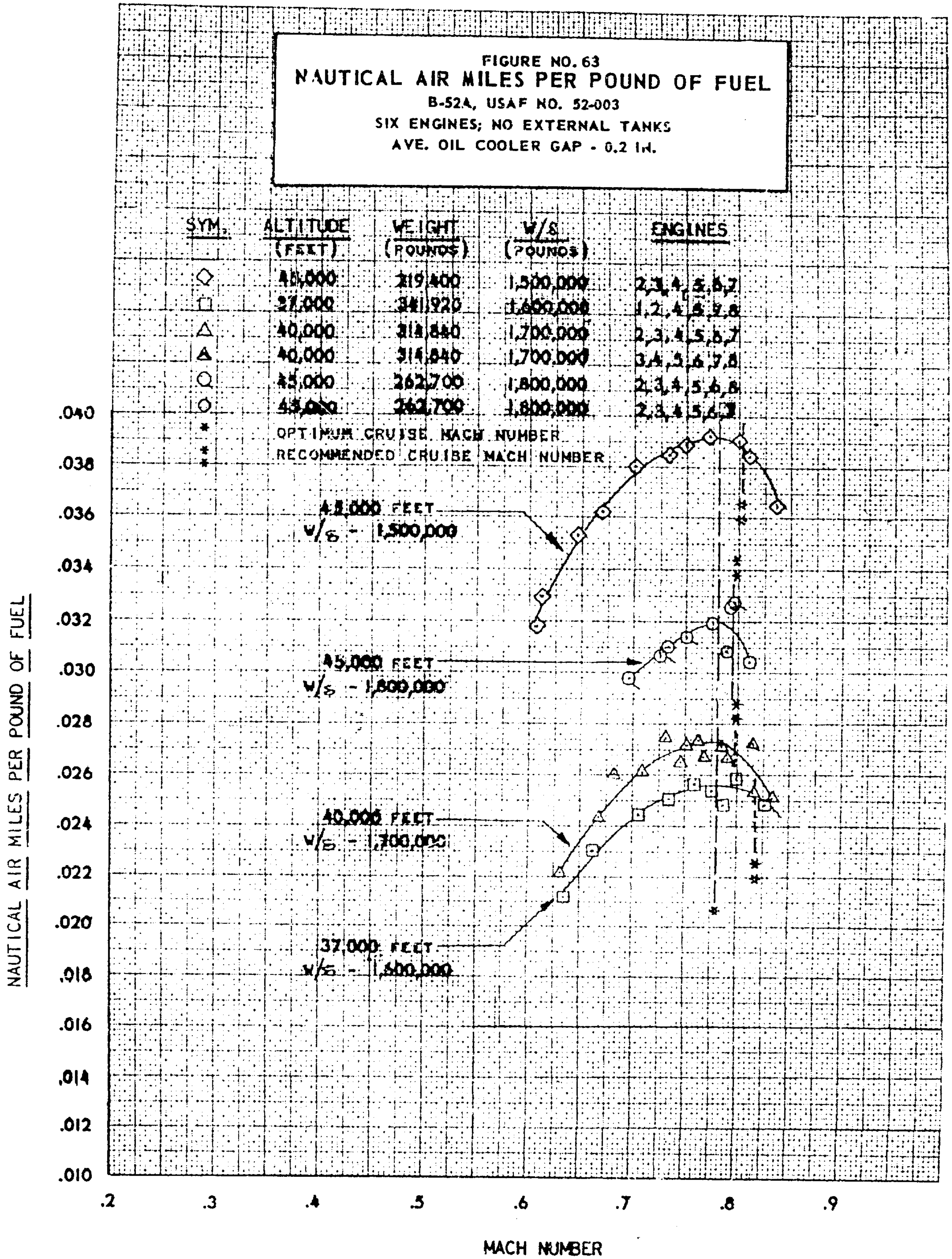


FIGURE NO. 62
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
SEVEN ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
37,000 FEET
W/δ -1,600,000
40,000 FEET
W/δ -1,700,000
45,000 FEET
W/δ -1,800,000
42,000 FEET
W/δ -1,900,000
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS) CRUISE MACH NUMBER OPTIMUM RECOMMENDED
□ 37,000 341,920 1,600,000 .750 .777
△ 40,000 314,800 1,700,000 .760 .785
◇ 45,000 262,440 1,800,000 .775 .810
○ 42,000 319,770 1,900,000 .770 .790
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL - 1000 LB MI/LB
MACH NUMBER
0
1
2
3
4
5
6
7
8
9
10
.2
.3
.4
.5
.6
.7
.8
.9

FIGURE NO. 63
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
SIX ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.



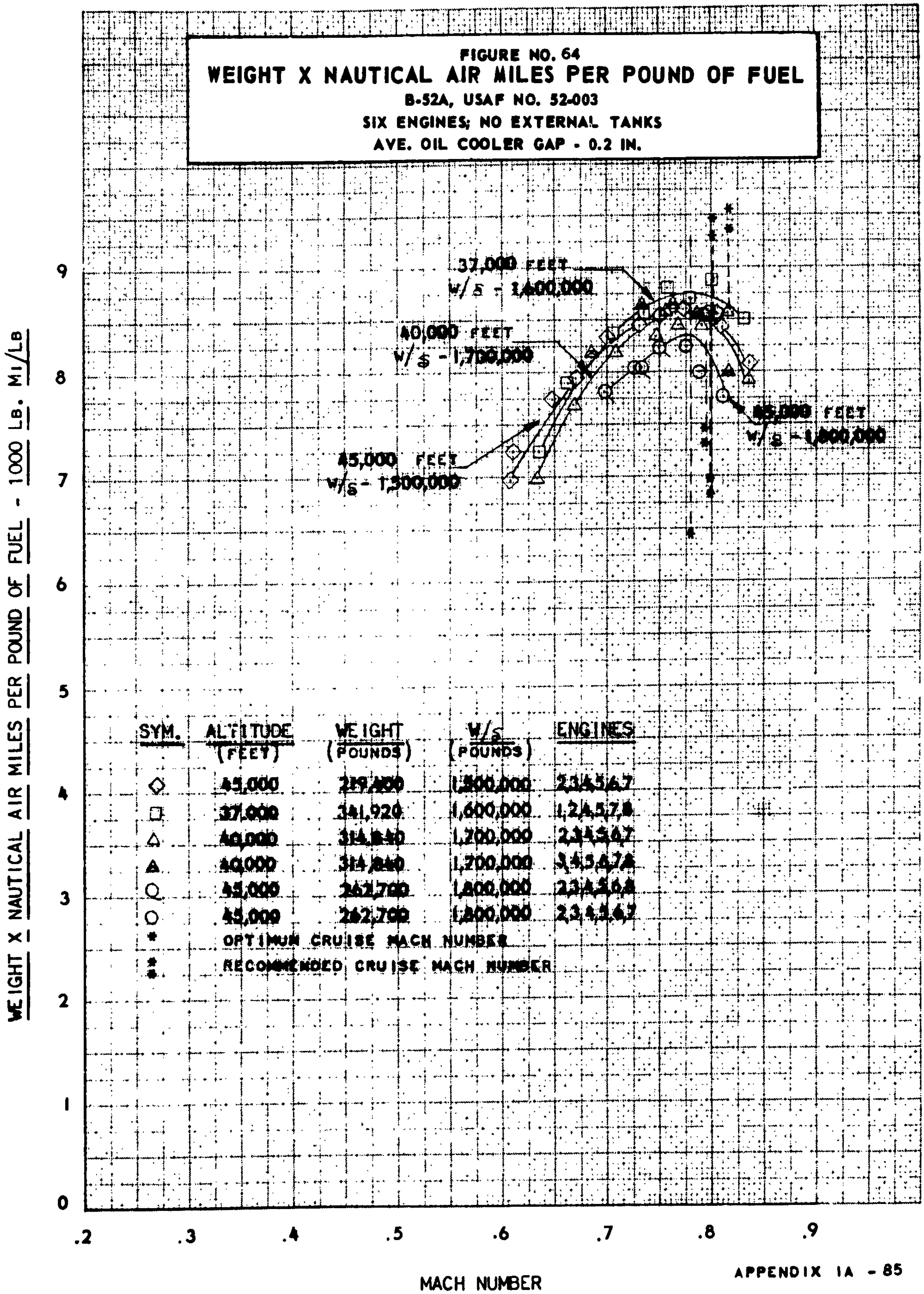


FIGURE NO. 64
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
SIX ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

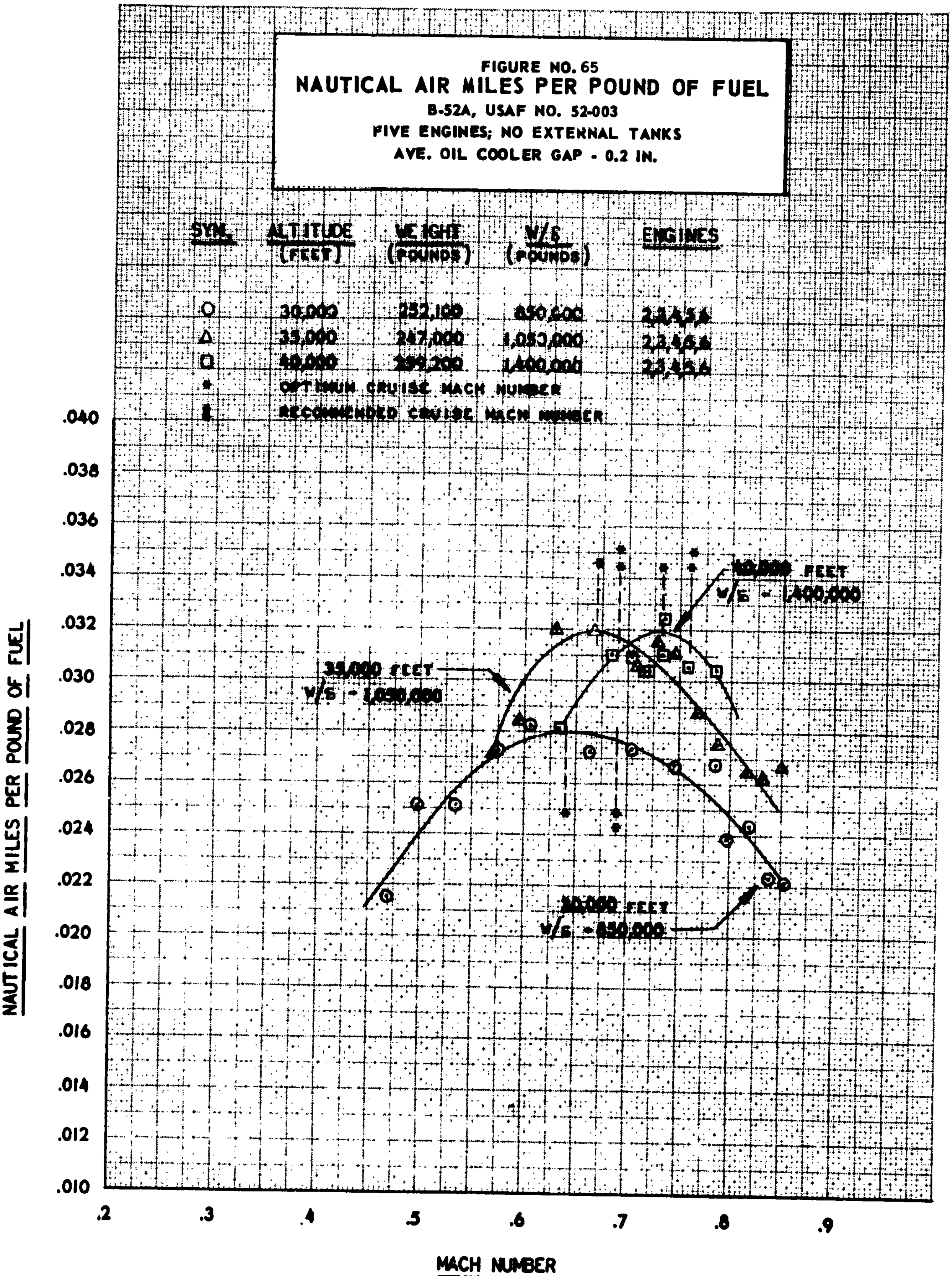


FIGURE NO. 65
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
FIVE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
ENGINES
30,000
252,100
850,000
35,000
247,000
1,050,000
40,000
1,400,000
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
40,000 FEET
W/δ - 1,400,000
35,000 FEET
W/δ - 1,050,000
30,000 FEET
W/δ - 850,000
NAUTICAL AIR MILES PER POUND OF FUEL
MACH NUMBER
.040
.038
.036
.034
.032
.030
.028
.026
.024
.022
.020
.018
.016
.014
.012
.010
.2
.3
.4
.5
.6
.7
.8
.9

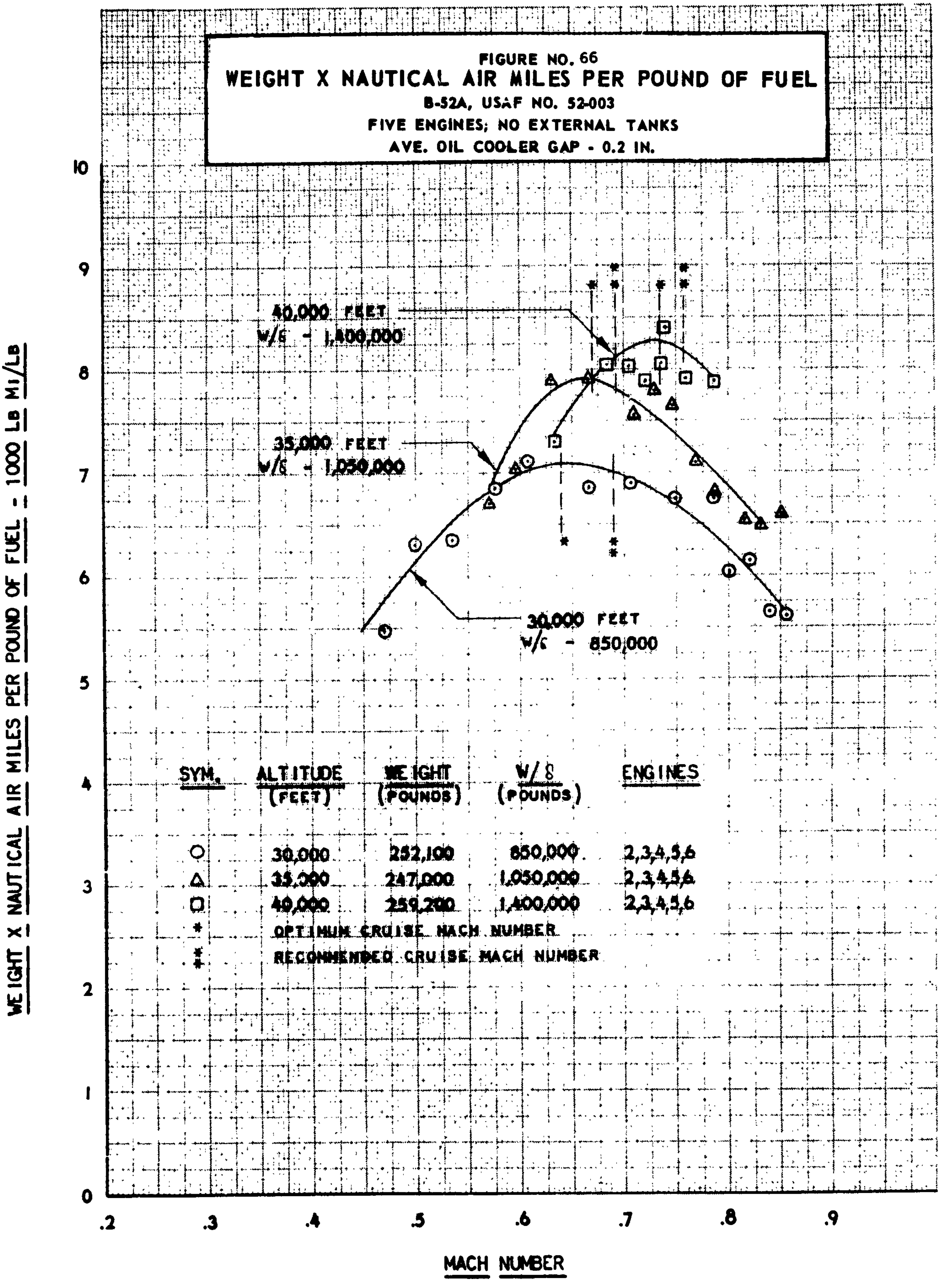


FIGURE NO. 66
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
FIVE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
40,000 FEET
W/δ - 1,400,000
35,000 FEET
W/δ - 1,050,000
30,000 FEET
W/δ - 850,000
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS) ENGINES
○ 30,000 252,100 850,000 2,3,4,5,6
△ 35,000 247,000 1,050,000 2,3,4,5,6
□ 40,000 259,200 1,400,000 2,3,4,5,6
* OPTIMUM CRUISE MACH NUMBER
** RECOMMENDED CRUISE MACH NUMBER
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL - 1000 LB MI/LB
MACH NUMBER
0
1
2
3
4
5
6
7
8
9
10
.2
.3
.4
.5
.6
.7
.8
.9

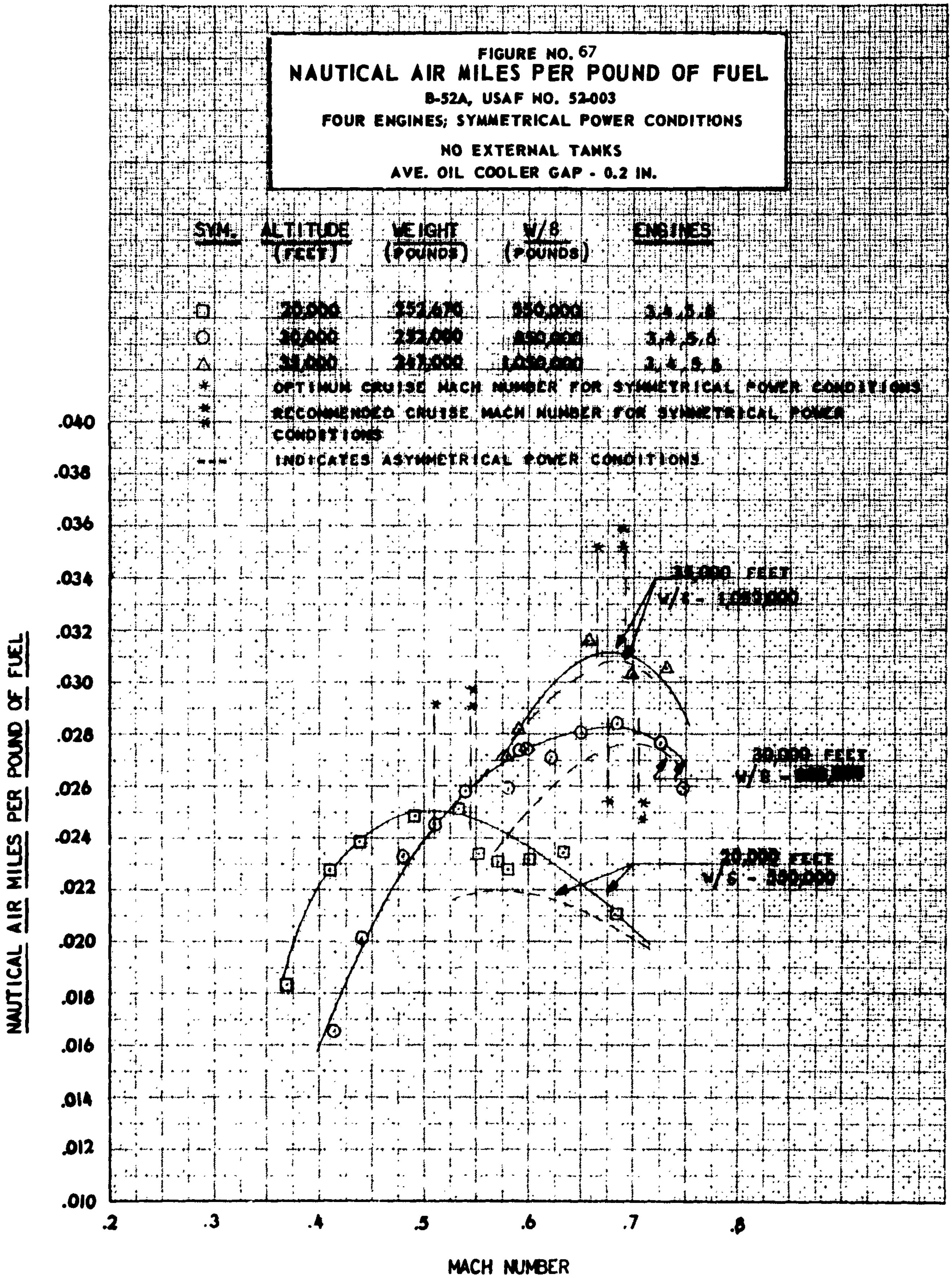


FIGURE NO. 67
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
FOUR ENGINES; SYMMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

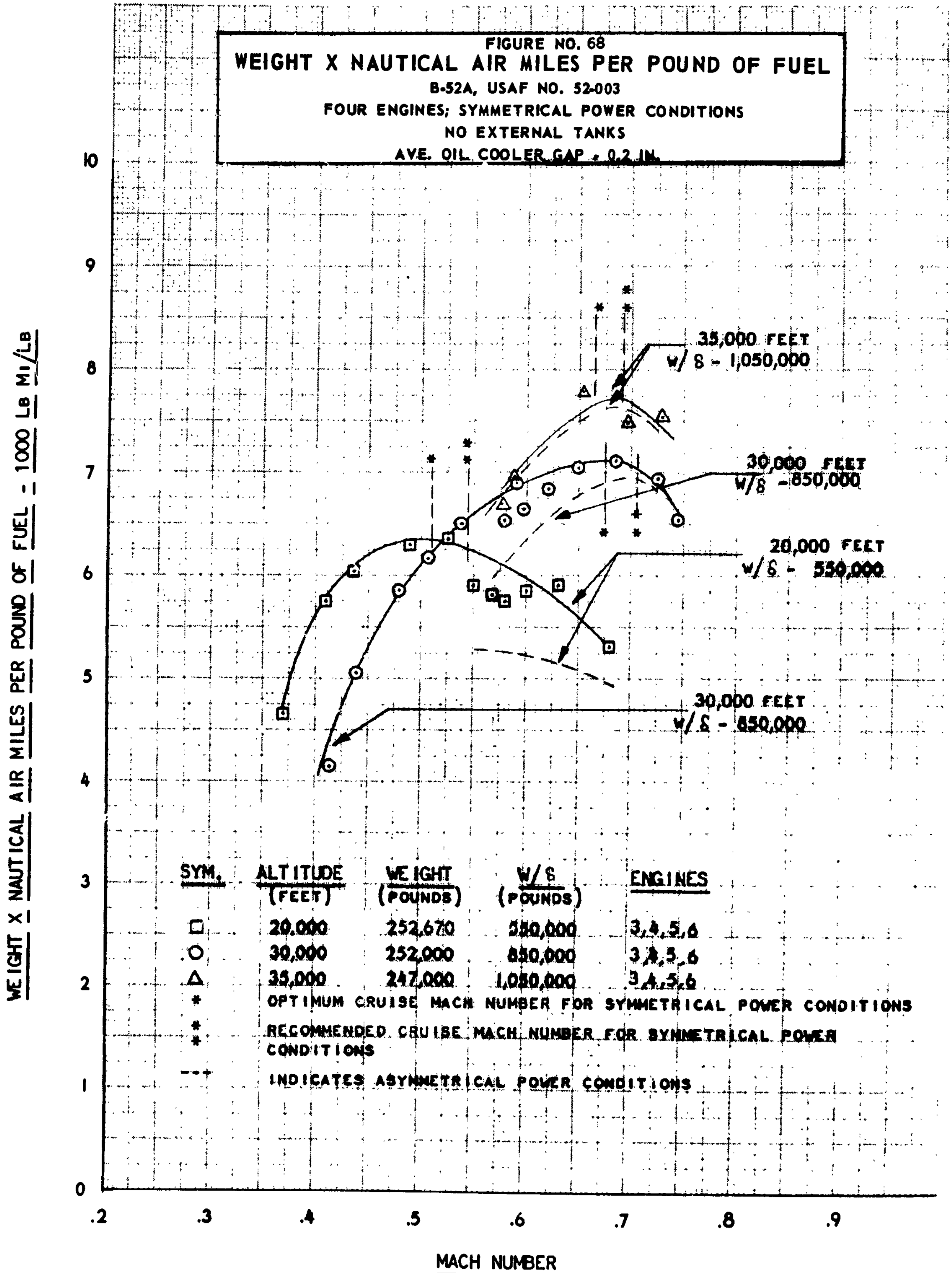


FIGURE NO. 68
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
FOUR ENGINES; SYMMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
35,000 FEET
W/δ - 1,050,000
30,000 FEET
W/δ - 850,000
20,000 FEET
W/δ - 550,000
30,000 FEET
W/δ - 850,000
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS) ENGINES
□ 20,000 252,670 550,000 3,4,5,6
○ 30,000 252,000 850,000 3,4,5,6
△ 35,000 247,000 1,050,000 3,4,5,6
* OPTIMUM CRUISE MACH NUMBER FOR SYMMETRICAL POWER CONDITIONS
** RECOMMENDED CRUISE MACH NUMBER FOR SYMMETRICAL POWER CONDITIONS
--- INDICATES ASYMMETRICAL POWER CONDITIONS
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL - 1000 LB MI/LB
MACH NUMBER
0
1
2
3
4
5
6
7
8
9
10
.2
.3
.4
.5
.6
.7
.8
.9

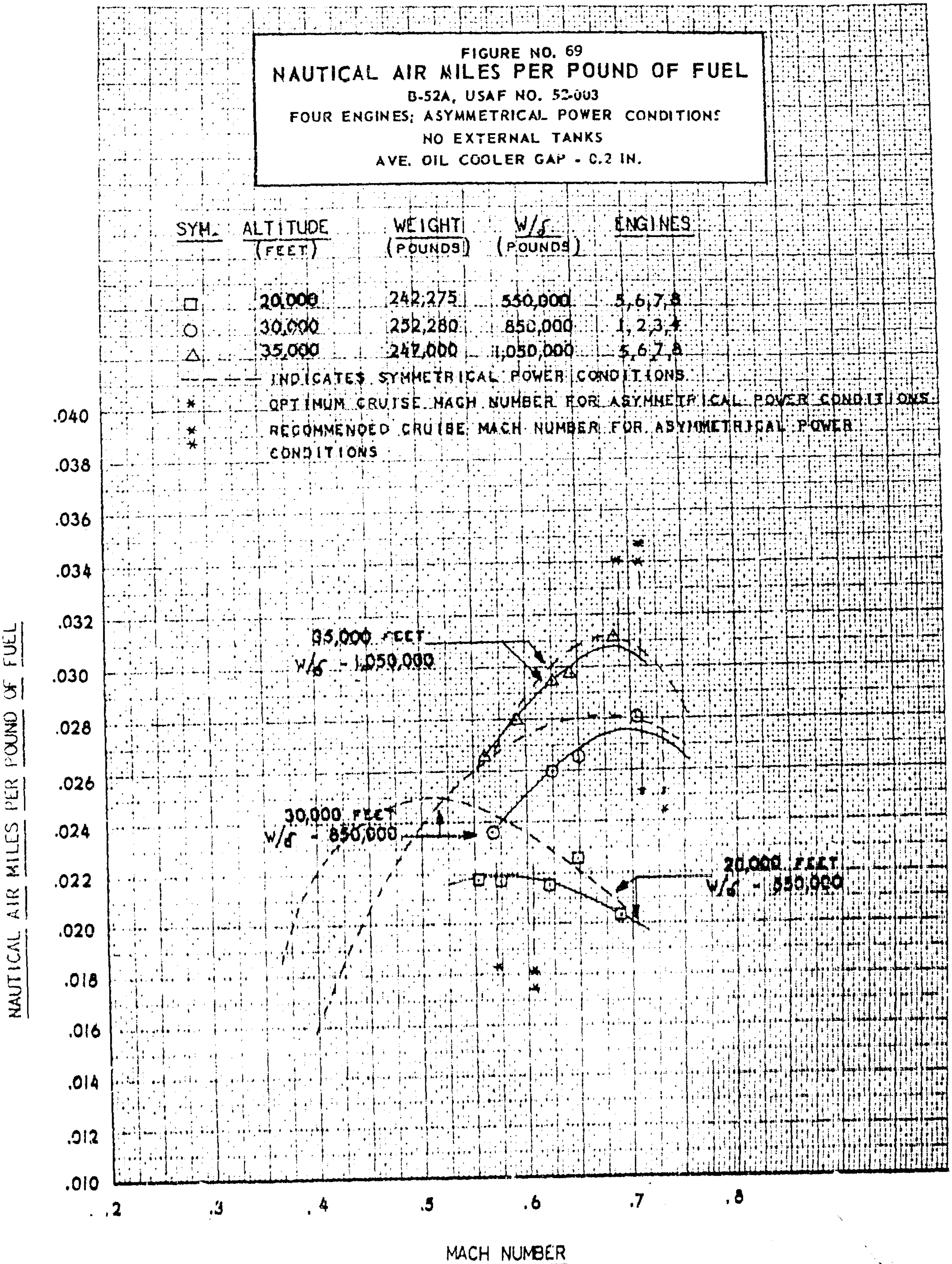


FIGURE NO. 69
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
FOUR ENGINES; ASYMMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS) ENGINES
□ 20,000 242,275 550,000 5,6,7,8
○ 30,000 252,280 850,000 1,2,3,4
△ 35,000 247,000 1,050,000 5,6,7,8
INDICATES SYMMETRICAL POWER CONDITIONS
OPTIMUM CRUISE MACH NUMBER FOR ASYMMETRICAL POWER CONDITIONS
RECOMMENDED CRUISE MACH NUMBER FOR ASYMMETRICAL POWER CONDITIONS
35,000 FEET
W/δ - 1,050,000
30,000 FEET
W/δ - 850,000
20,000 FEET
W/δ - 550,000
NAUTICAL AIR MILES PER POUND OF FUEL
.040
.038
.036
.034
.032
.030
.028
.026
.024
.022
.020
.018
.016
.014
.012
.010
.2
.3
.4
.5
.6
.7
.8
MACH NUMBER

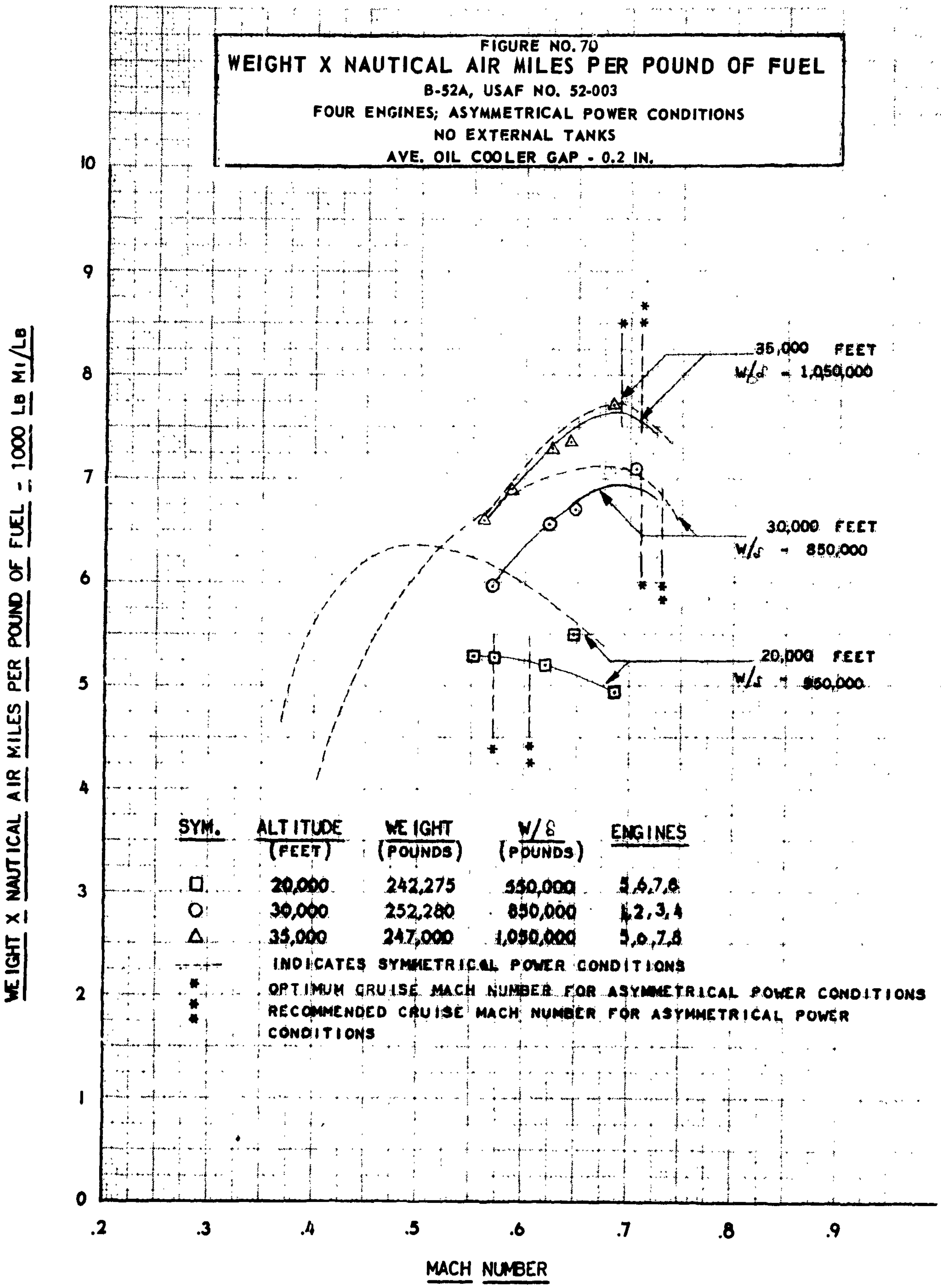
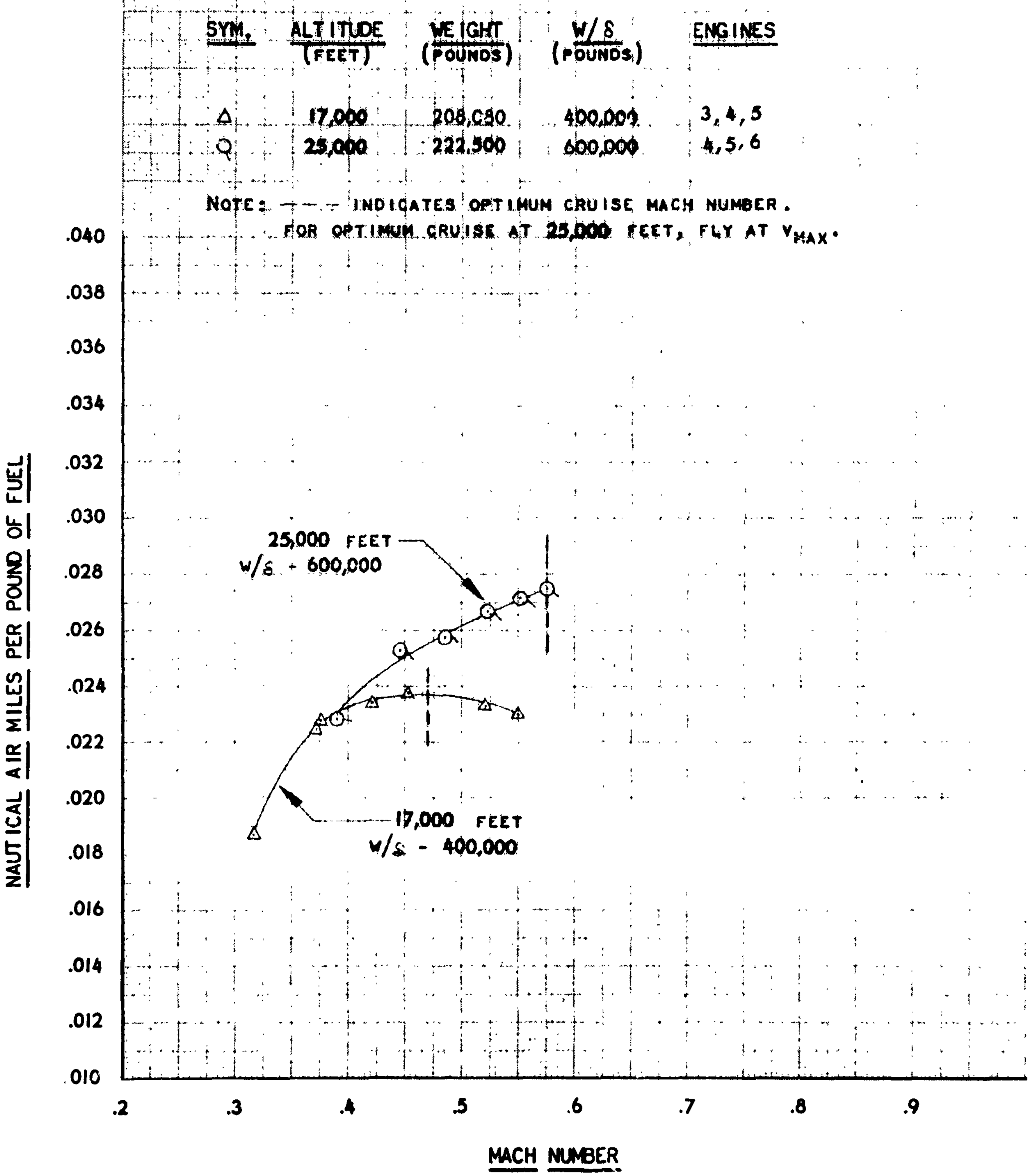


FIGURE NO. 70
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
FOUR ENGINES; ASYMMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
35,000 FEET
W/δ - 1,050,000
30,000 FEET
W/δ - 850,000
20,000 FEET
W/δ - 550,000
SYM. | ALTITUDE (FEET) | WEIGHT (POUNDS) | W/δ (POUNDS) | ENGINES
□ | 20,000 | 242,275 | 550,000 | 5,6,7,8
○ | 30,000 | 252,280 | 850,000 | 1,2,3,4
△ | 35,000 | 247,000 | 1,050,000 | 5,6,7,8
INDICATES SYMMETRICAL POWER CONDITIONS
OPTIMUM CRUISE MACH NUMBER FOR ASYMMETRICAL POWER CONDITIONS
RECOMMENDED CRUISE MACH NUMBER FOR ASYMMETRICAL POWER CONDITIONS
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL - 1000 LB MI/LB
MACH NUMBER
0
1
2
3
4
5
6
7
8
9
10
.2
.3
.4
.5
.6
.7
.8
.9

FIGURE NO. 71
NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
THREE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.



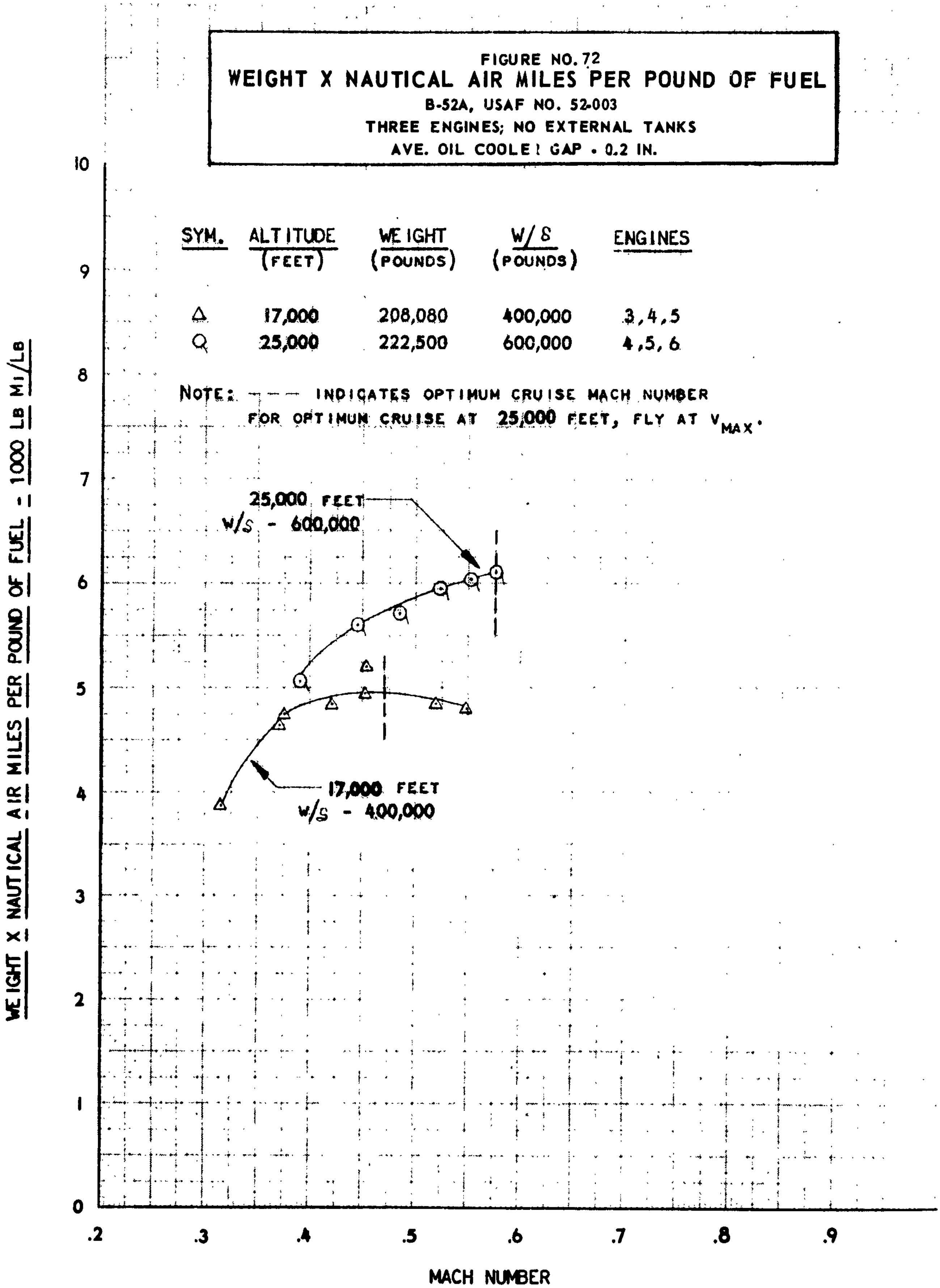


FIGURE NO. 72
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
B-52A, USAF NO. 52-003
THREE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLE! GAP • 0.2 IN.
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS) ENGINES
△ 17,000 208,080 400,000 3,4,5
⊙ 25,000 222,500 600,000 4,5,6
NOTE: --- INDICATES OPTIMUM CRUISE MACH NUMBER
FOR OPTIMUM CRUISE AT 25,000 FEET, FLY AT VMAX.
25,000 FEET
W/δ - 600,000
17,000 FEET
W/δ - 400,000
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL - 1000 LB MI/LB
MACH NUMBER
0
1
2
3
4
5
6
7
8
9
10
.2
.3
.4
.5
.6
.7
.8
.9

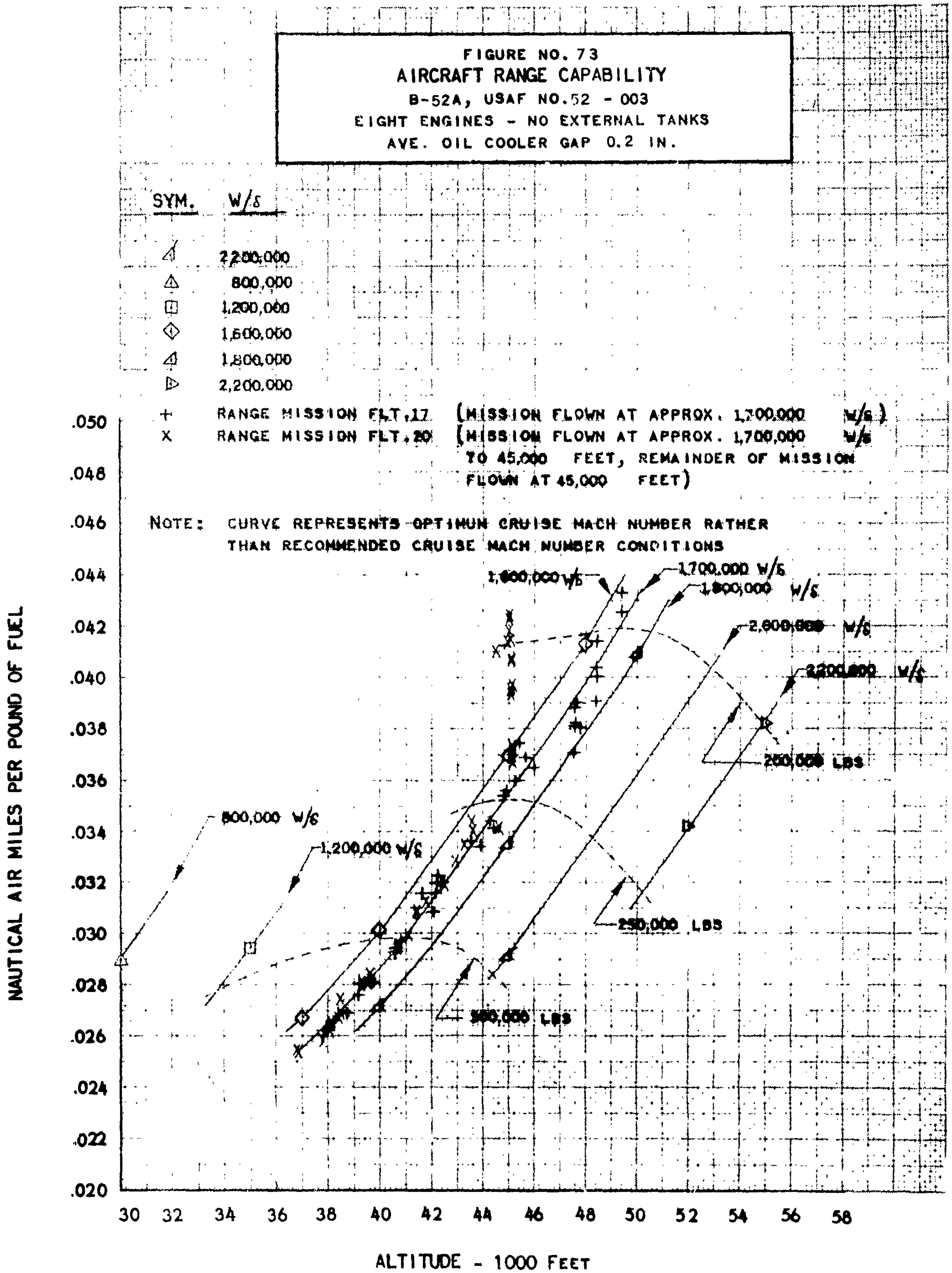


FIGURE NO. 73
AIRCRAFT RANGE CAPABILITY
B-52A, USAF NO. 52 - 003
EIGHT ENGINES - NO EXTERNAL TANKS
AVE. OIL COOLER GAP 0.2 IN.
SYM. W/δ
2200,000
800,000
1,200,000
1,600,000
1,800,000
2,200,000
RANGE MISSION FLT. 17 (MISSION FLOWN AT APPROX. 1,700,000 W/δ)
RANGE MISSION FLT. 20 (MISSION FLOWN AT APPROX. 1,700,000 W/δ TO 45,000 FEET, REMAINDER OF MISSION FLOWN AT 45,000 FEET)
NOTE: CURVE REPRESENTS OPTIMUN CRUISE MACH NUMBER RATHER THAN RECOMMENDED CRUISE MACH NUMBER CONDITIONS
1,600,000 W/δ
1,700,000 W/δ
1,800,000 W/δ
2,000,000 W/δ
2,200,000 W/δ
800,000 W/δ
1,200,000 W/δ
200,000 LBS
250,000 LBS
300,000 LBS
NAUTICAL AIR MILES PER POUND OF FUEL
ALTITUDE - 1000 FEET
.050
.048
.046
.044
.042
.040
.038
.036
.034
.032
.030
.028
.026
.024
.022
.020
30
32
34
36
38
40
42
44
46
48
50
52
54
56
58

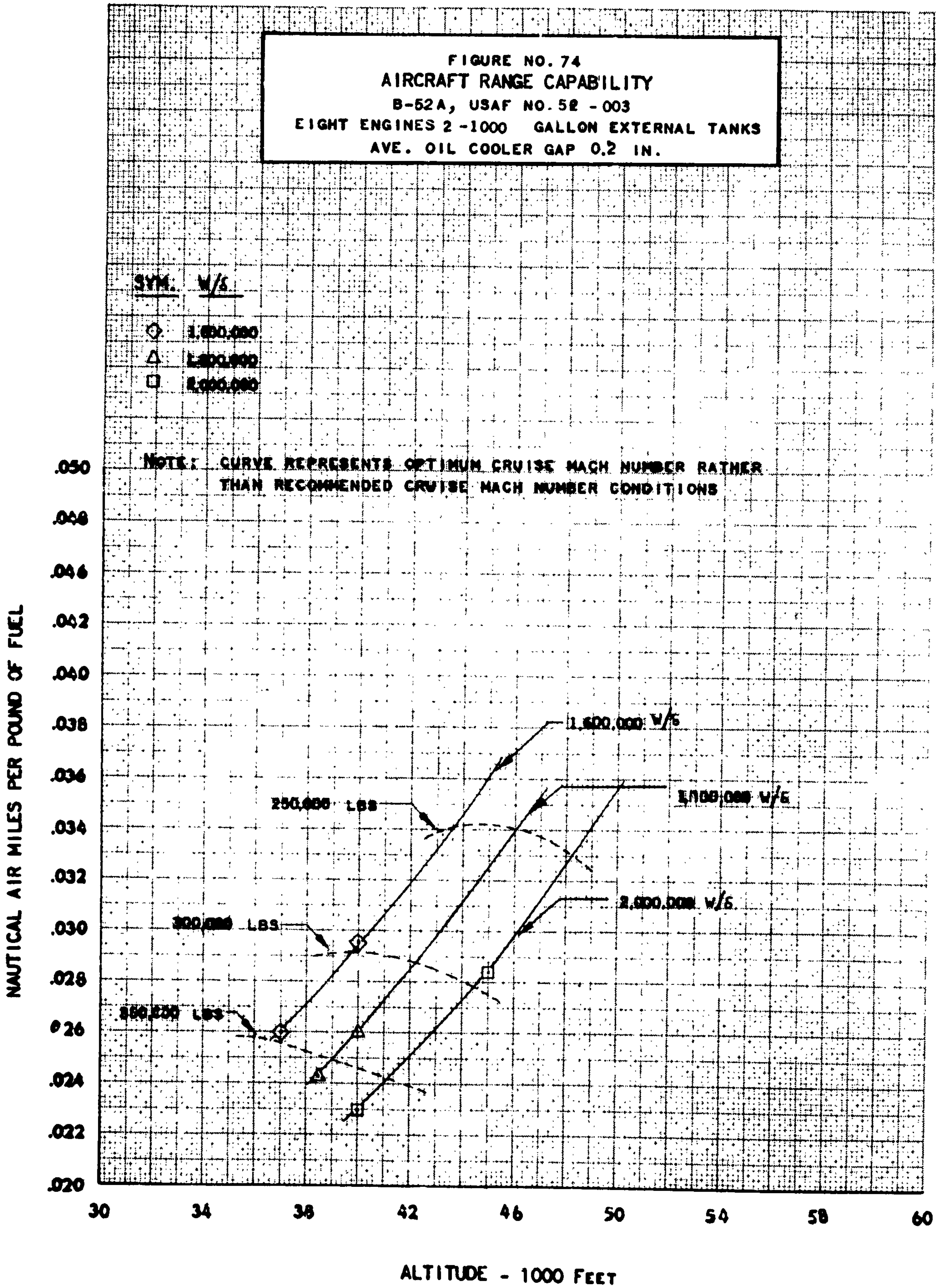


FIGURE NO. 74
AIRCRAFT RANGE CAPABILITY
B-52A, USAF NO. 52 - 003
EIGHT ENGINES 2 - 1000 GALLON EXTERNAL TANKS
AVE. OIL COOLER GAP 0.2 IN.
SYM. W/δ
1,600,000
1,800,000
2,000,000
NOTE: CURVE REPRESENTS OPTIMUM CRUISE MACH NUMBER RATHER THAN RECOMMENDED CRUISE MACH NUMBER CONDITIONS
1,600,000 W/δ
1,800,000 W/δ
2,000,000 W/δ
250,000 LBS
300,000 LBS
350,000 LBS
NAUTICAL AIR MILES PER POUND OF FUEL
.050
.048
.046
.042
.040
.038
.036
.034
.032
.030
.028
.026
.024
.022
.020
30
34
38
42
46
50
54
58
60
ALTITUDE - 1000 FEET

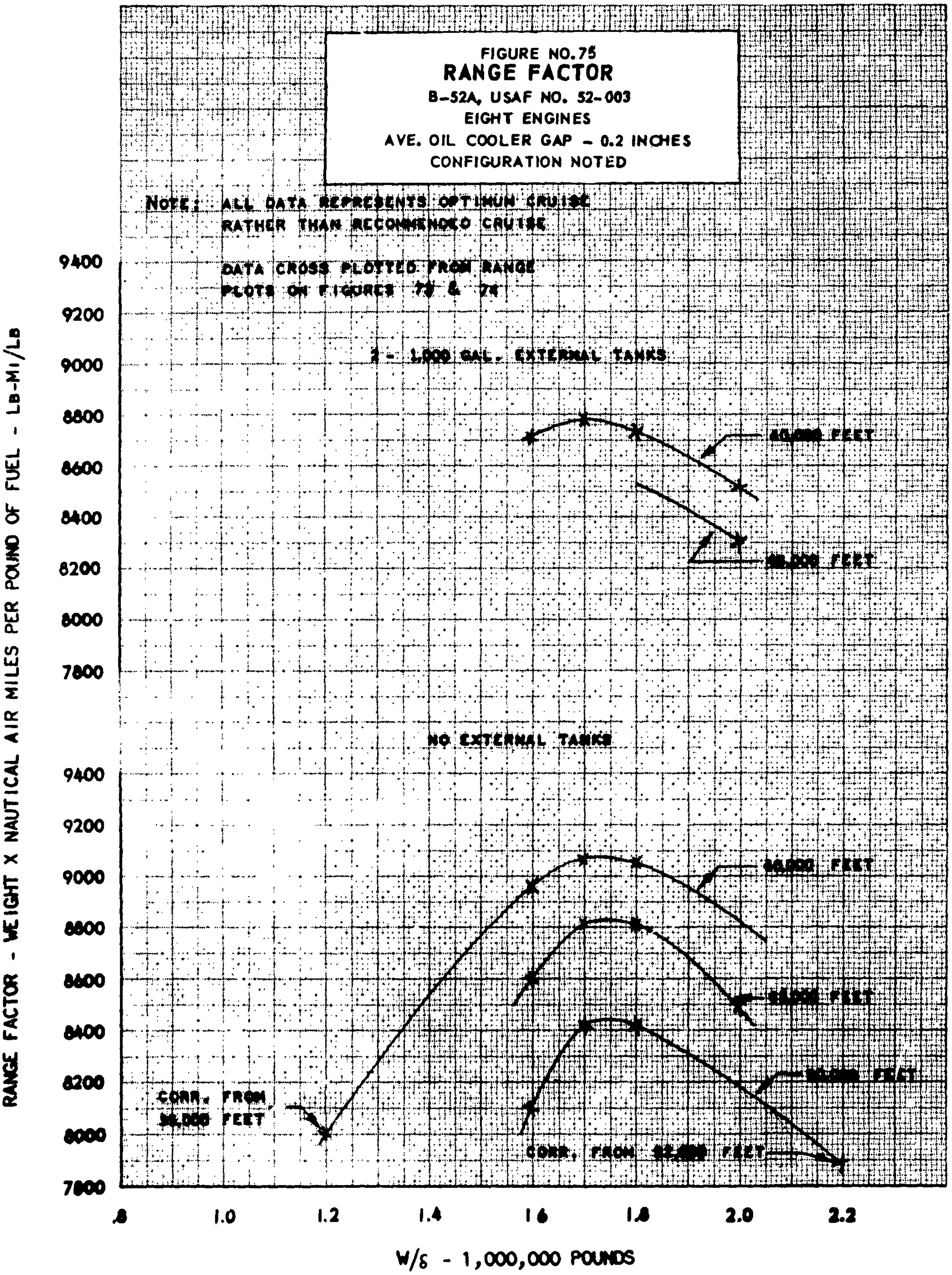


FIGURE NO.75
RANGE FACTOR
B-52A, USAF NO. 52-003
EIGHT ENGINES
AVE. OIL COOLER GAP - 0.2 INCHES
CONFIGURATION NOTED

RANGE MISSIONS

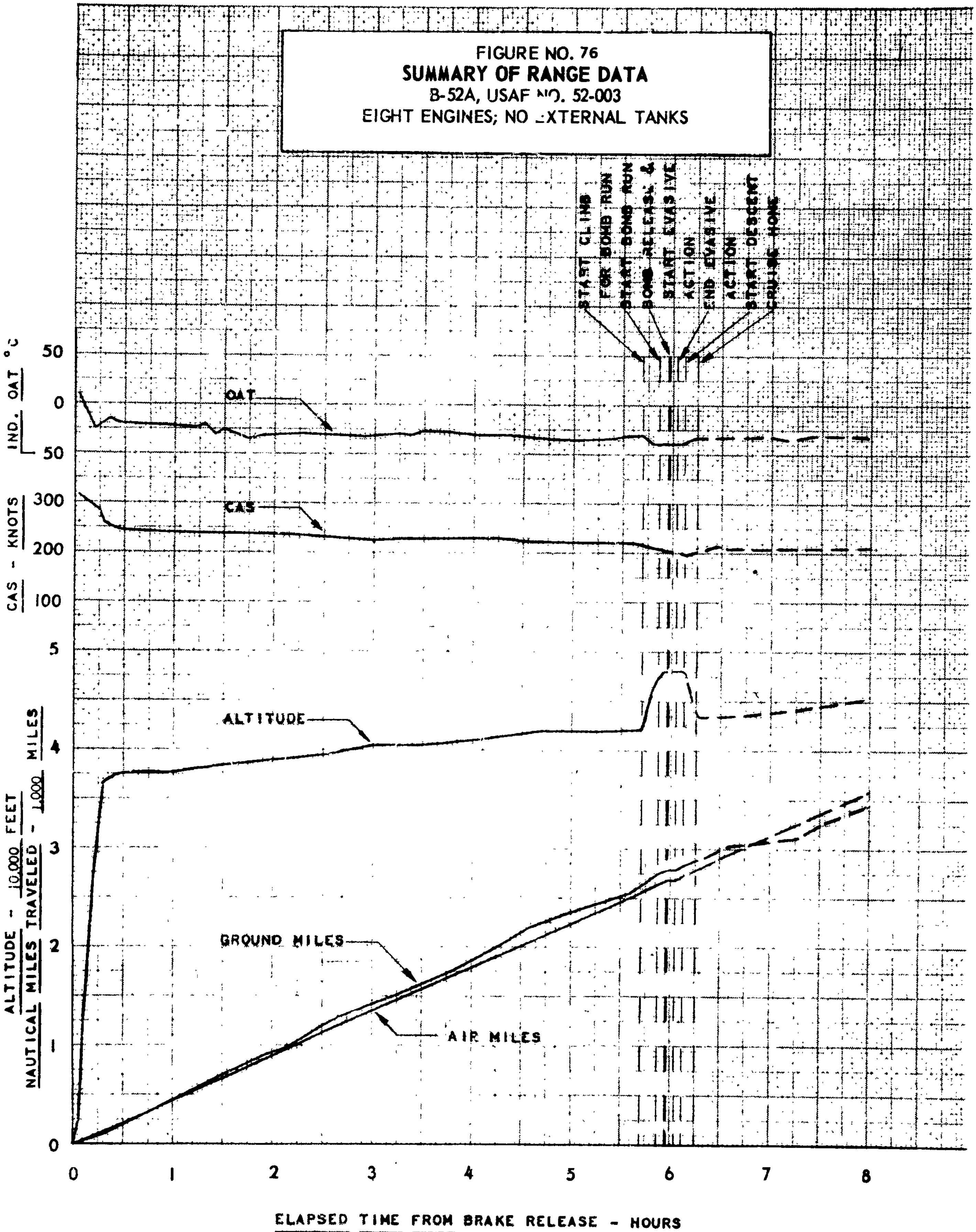


FIGURE NO. 76
SUMMARY OF RANGE DATA
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS

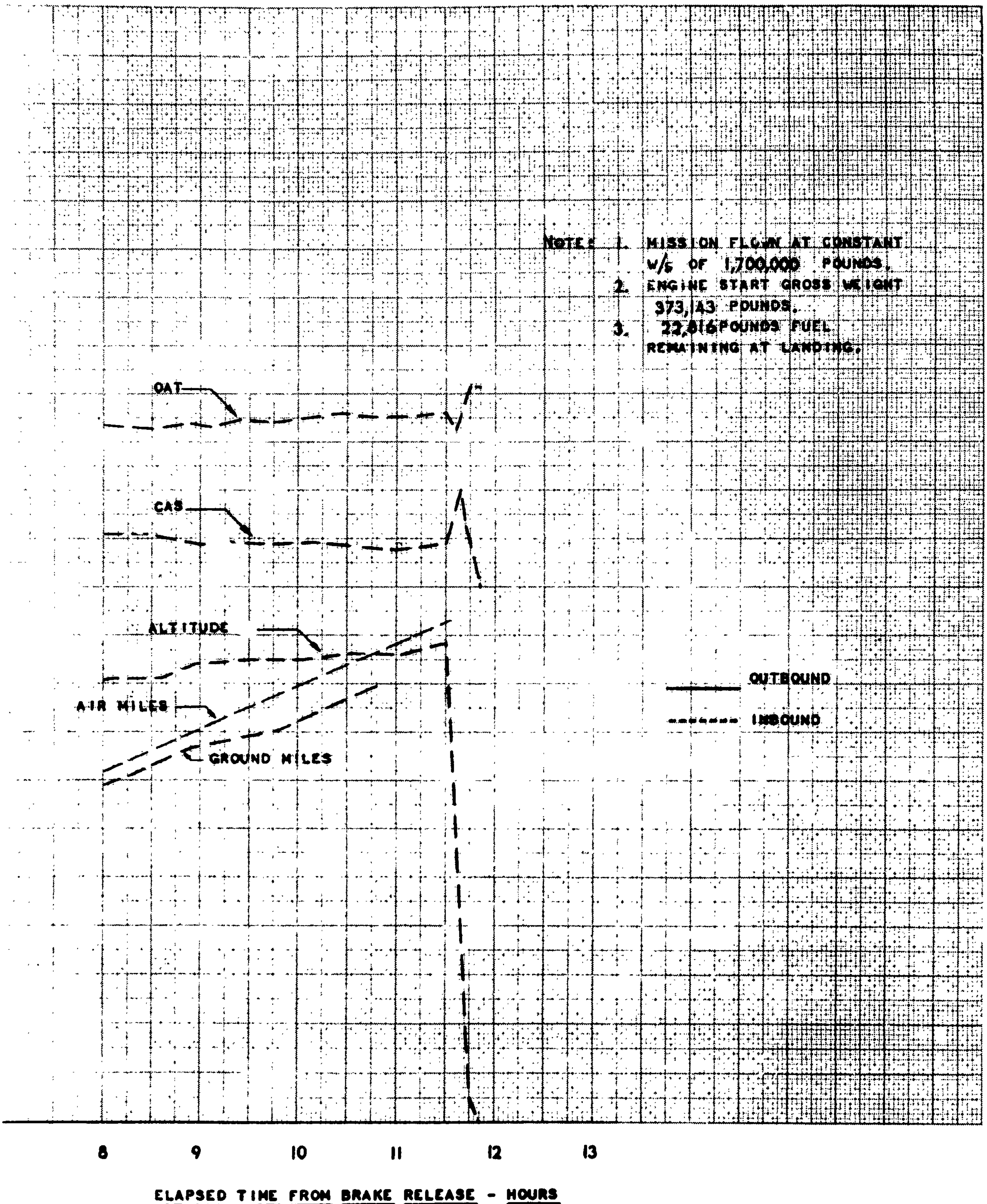
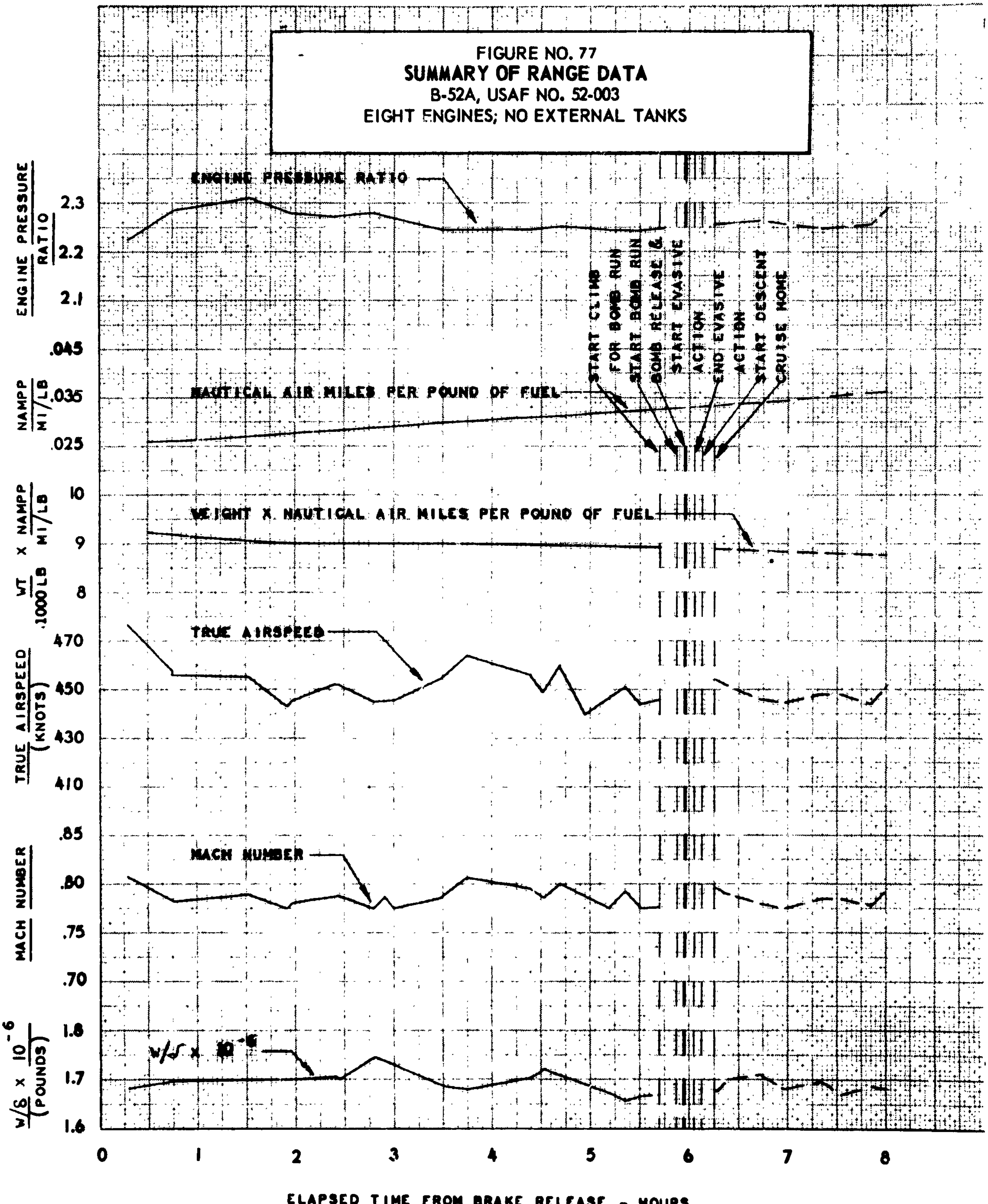

NOTE: 1. MISSION FLOWN AT CONSTANT W/δ OF 1,700,000 POUNDS.
2. ENGINE START GROSS WEIGHT 373,143 POUNDS.
3. 22,816 POUNDS FUEL REMAINING AT LANDING.
OAT
CAS
ALTITUDE
AIR MILES
GROUND MILES
OUTBOUND
INBOUND
8
9
10
11
12
13
ELAPSED TIME FROM BRAKE RELEASE - HOURS

FIGURE NO. 77
SUMMARY OF RANGE DATA
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS



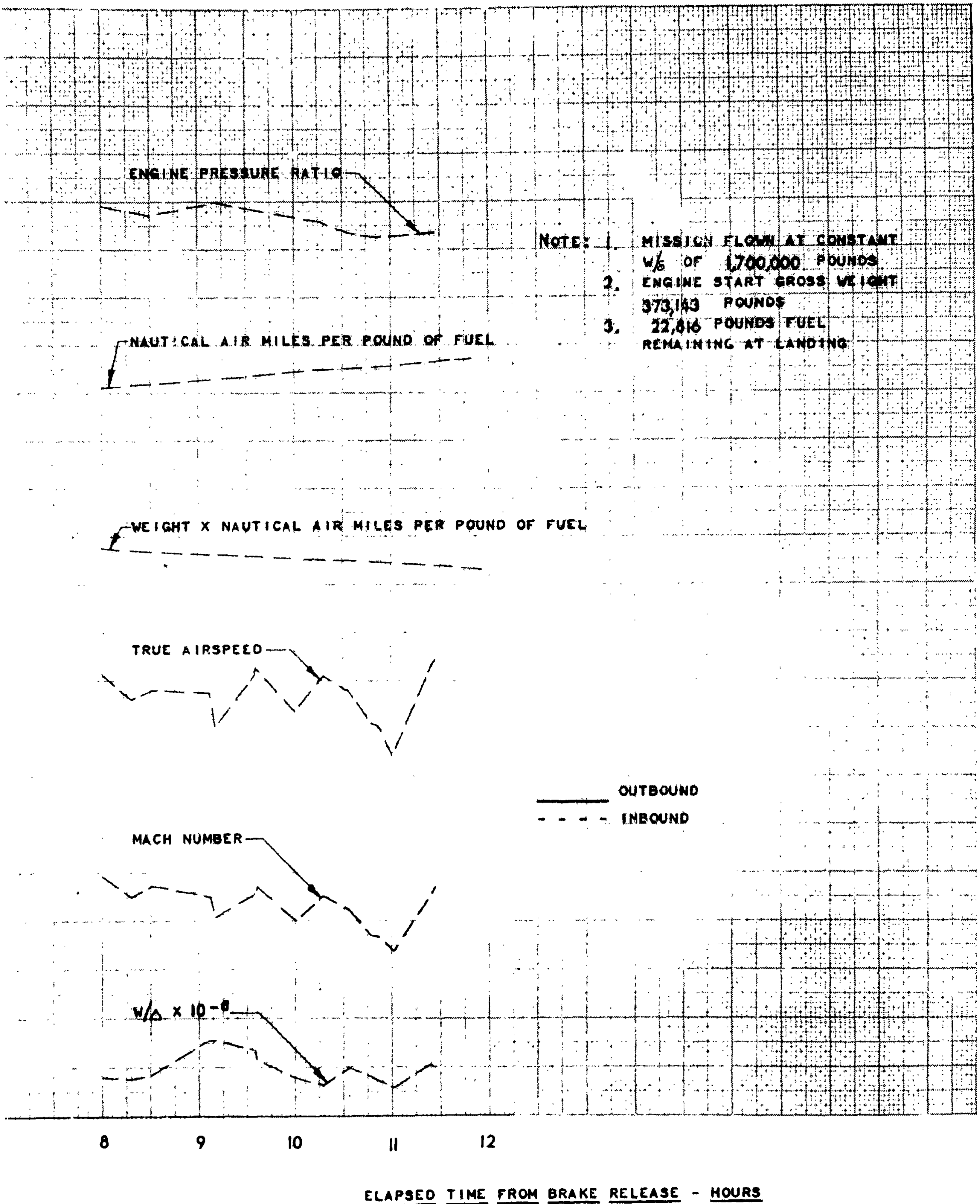
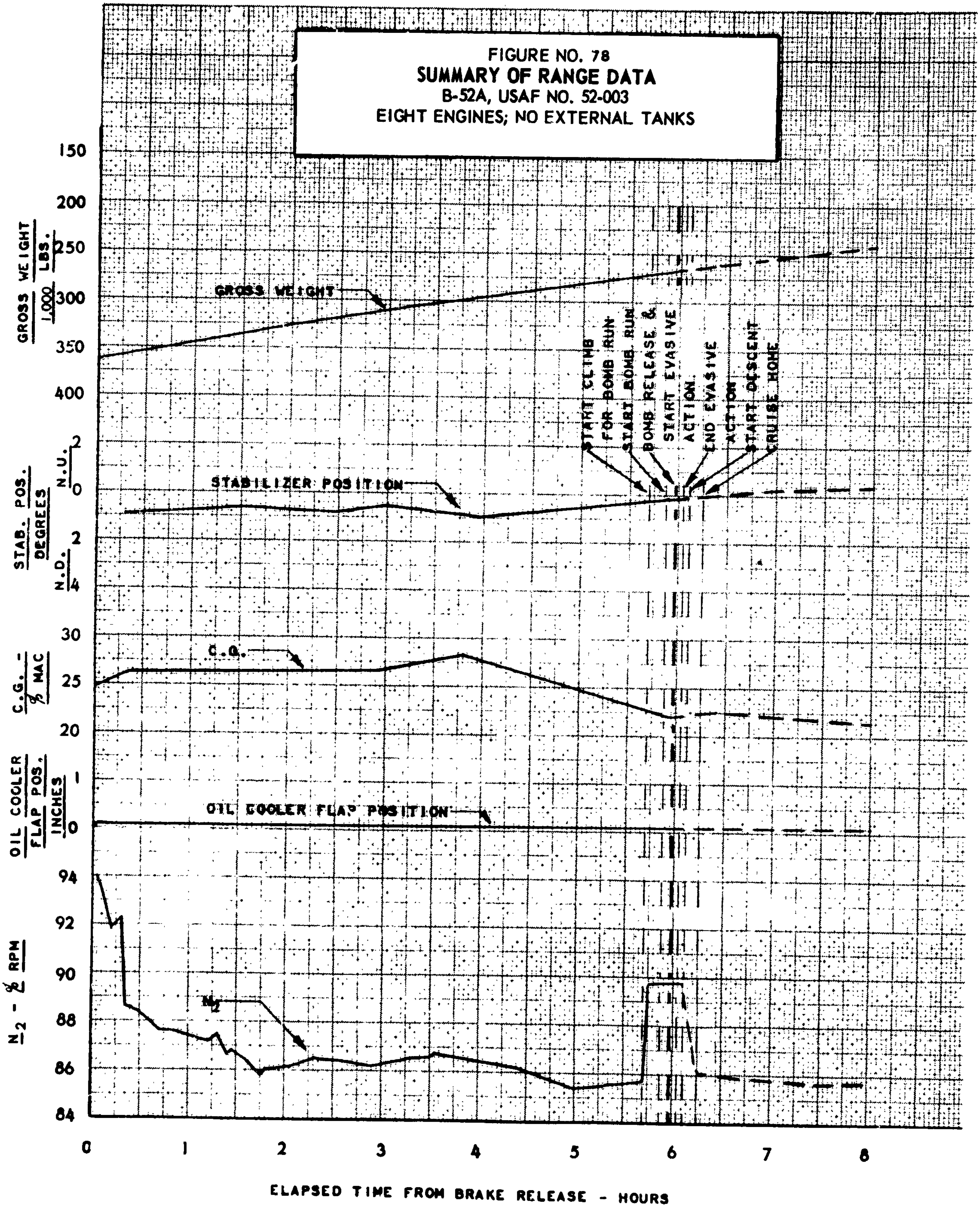
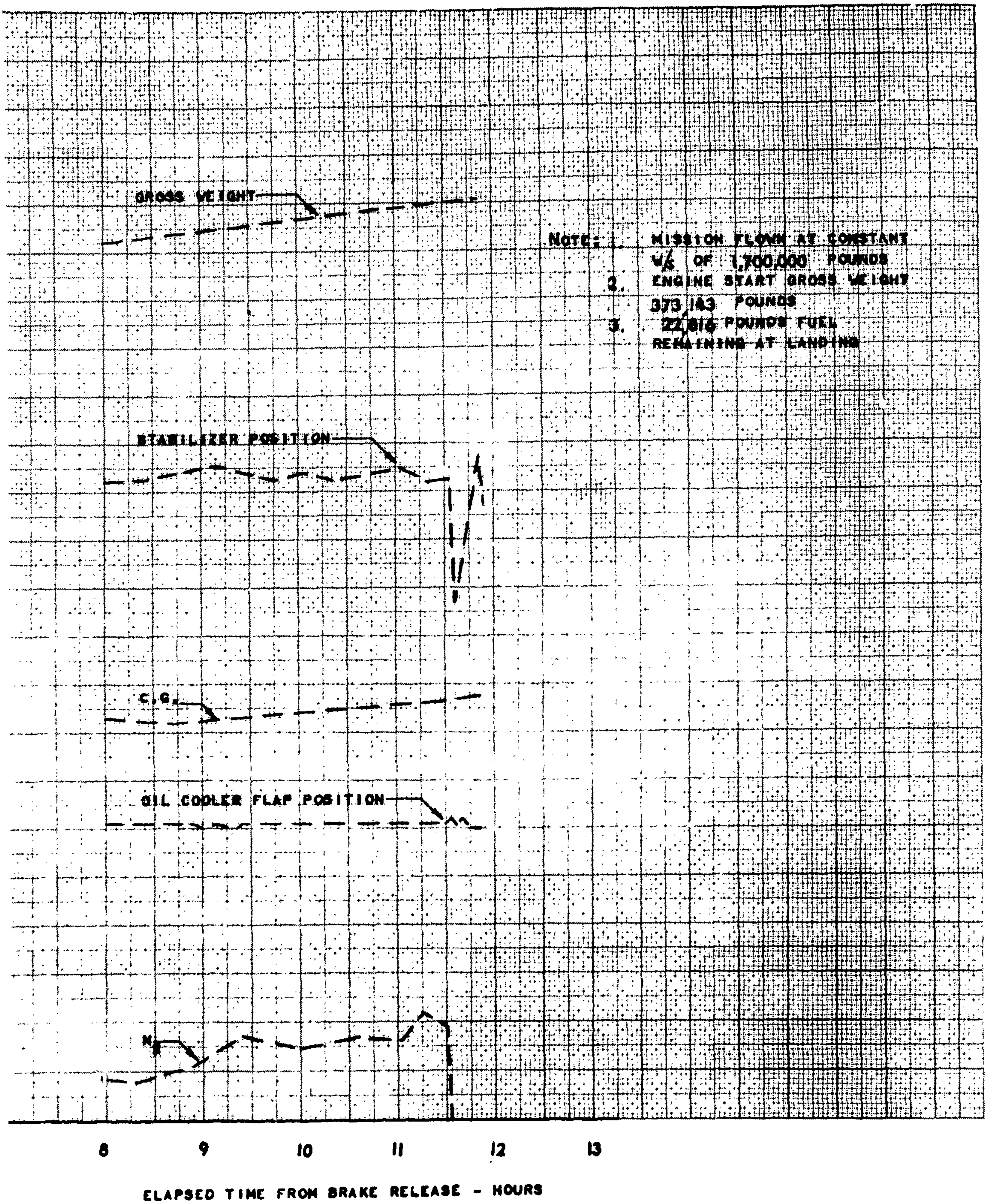

ENGINE PRESSURE RATIO
Note: 1. MISSION FLOWN AT CONSTANT W/δ OF 1,700,000 POUNDS
2. ENGINE START GROSS WEIGHT 373,143 POUNDS
3. 22,816 POUNDS FUEL REMAINING AT LANDING
NAUTICAL AIR MILES PER POUND OF FUEL
WEIGHT X NAUTICAL AIR MILES PER POUND OF FUEL
TRUE AIRSPEED
OUTBOUND
INBOUND
MACH NUMBER
W/Δ x 10^-6
8
9
10
11
12
ELAPSED TIME FROM BRAKE RELEASE - HOURS

FIGURE NO. 78
SUMMARY OF RANGE DATA
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS




GROSS WEIGHT
NOTE: 1. MISSION FLOWN AT CONSTANT W/δ OF 1,700,000 POUNDS
2. ENGINE START GROSS WEIGHT 373,143 POUNDS
3. 22,816 POUNDS FUEL REMAINING AT LANDING
STABILIZER POSITION
C.G.
OIL COOLER FLAP POSITION
N
8
9
10
11
12
13
ELAPSED TIME FROM BRAKE RELEASE - HOURS

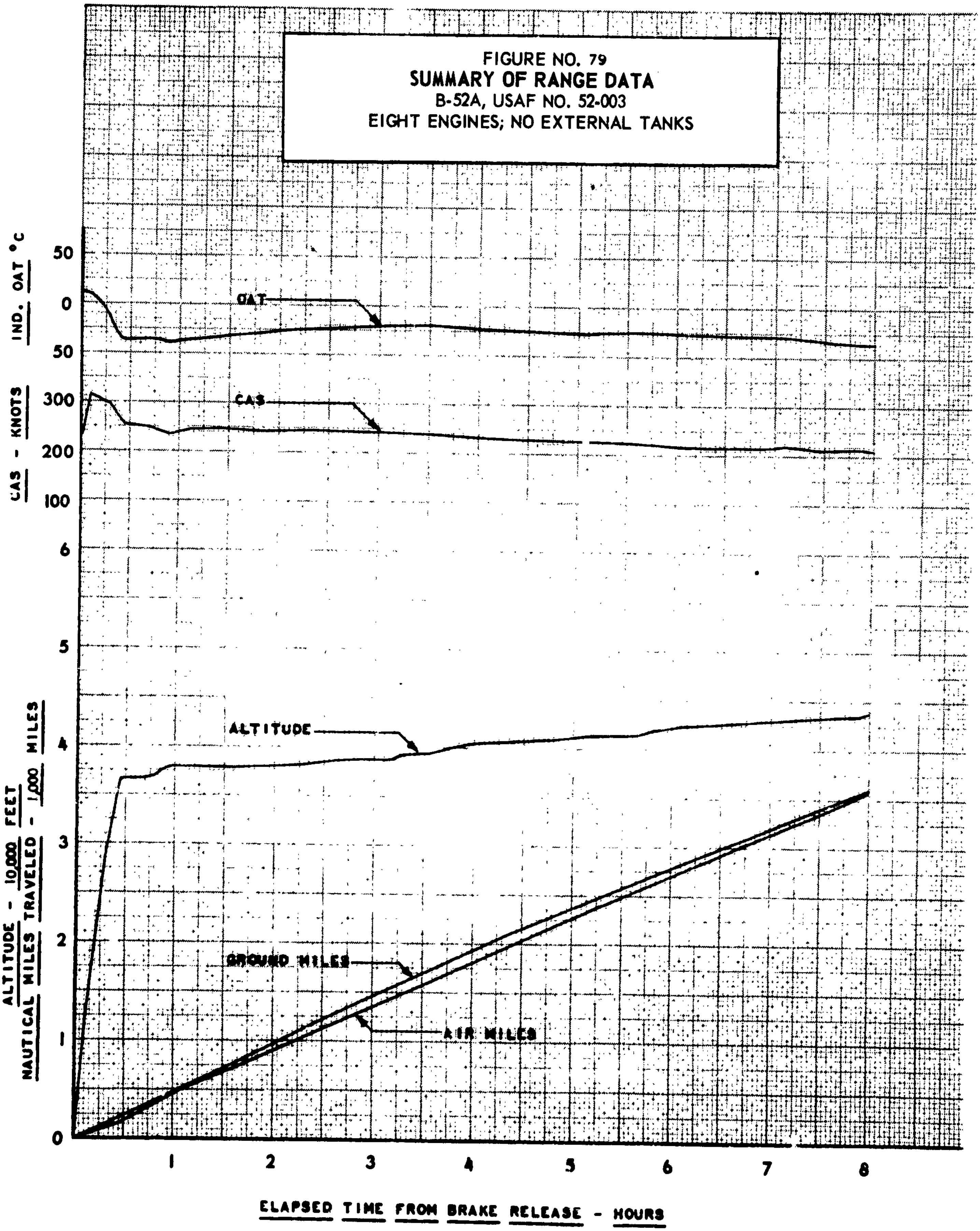


FIGURE NO. 79
SUMMARY OF RANGE DATA
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
IND. OAT °C
50
0
50
OAT
CAS - KNOTS
300
200
100
CAS
6
5
4
3
2
1
0
ALTITUDE - 10,000 FEET
NAUTICAL MILES TRAVELED - 1,000 MILES
ALTITUDE
GROUND MILES
AIR MILES
1
2
3
4
5
6
7
8
ELAPSED TIME FROM BRAKE RELEASE - HOURS

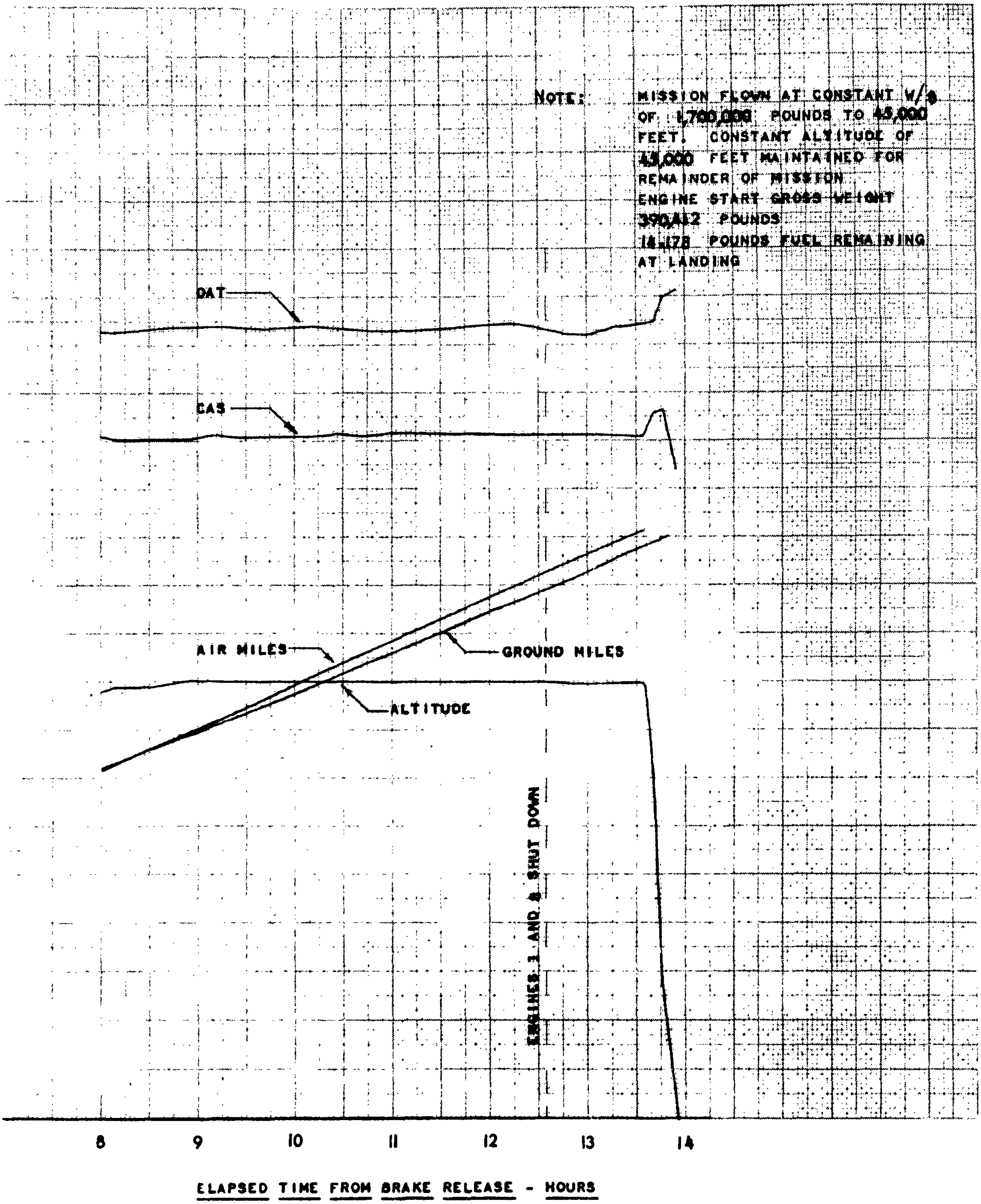
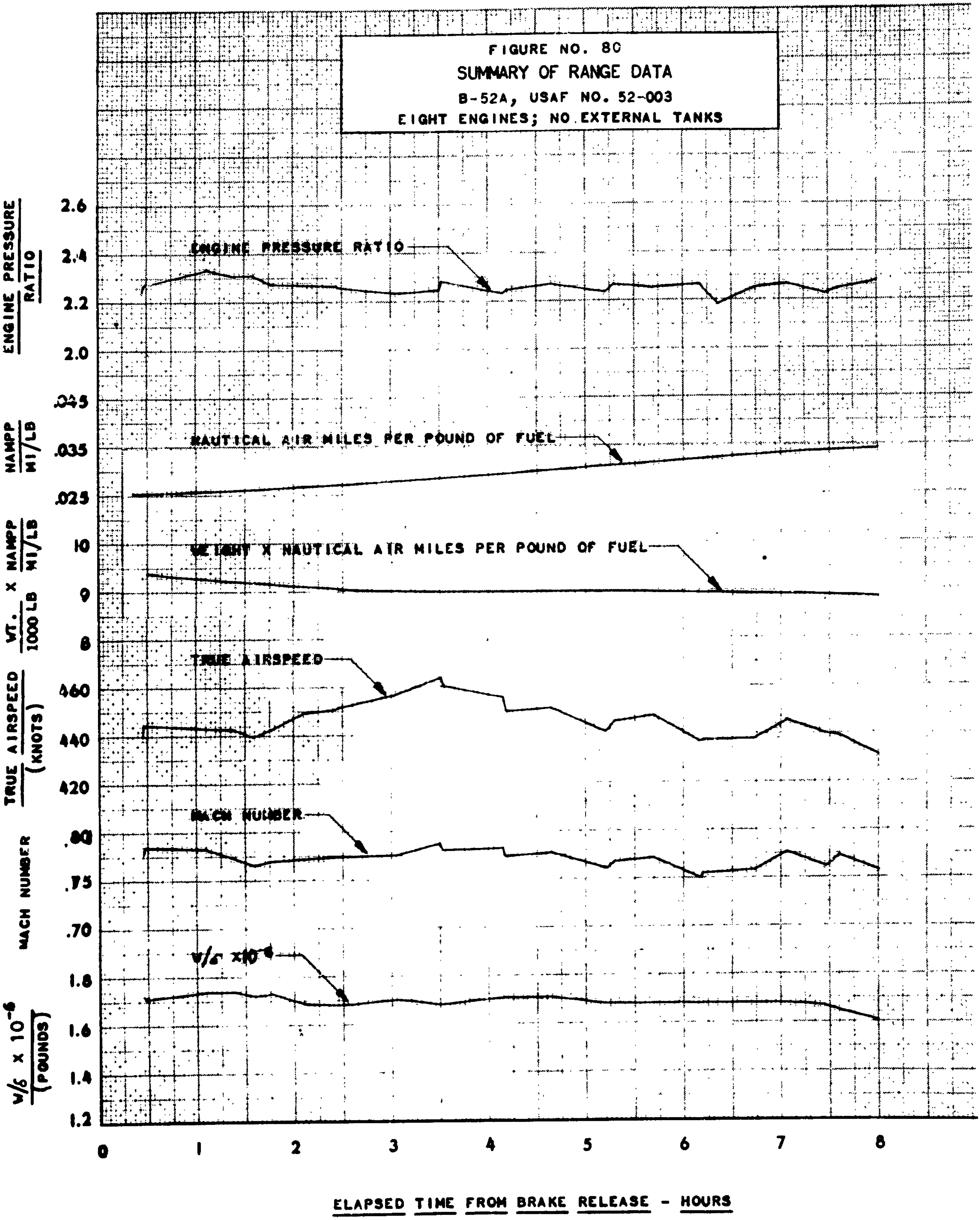

NOTE:
MISSION FLOWN AT CONSTANT W/δ OF 1,700,000 POUNDS TO 45,000 FEET. CONSTANT ALTITUDE OF 45,000 FEET MAINTAINED FOR REMAINDER OF MISSION
ENGINE START GROSS WEIGHT 390,412 POUNDS
14,178 POUNDS FUEL REMAINING AT LANDING
OAT
CAS
AIR MILES
GROUND MILES
ALTITUDE
ENGINES 1 AND 8 SHUT DOWN
8
9
10
11
12
13
14
ELAPSED TIME FROM BRAKE RELEASE - HOURS

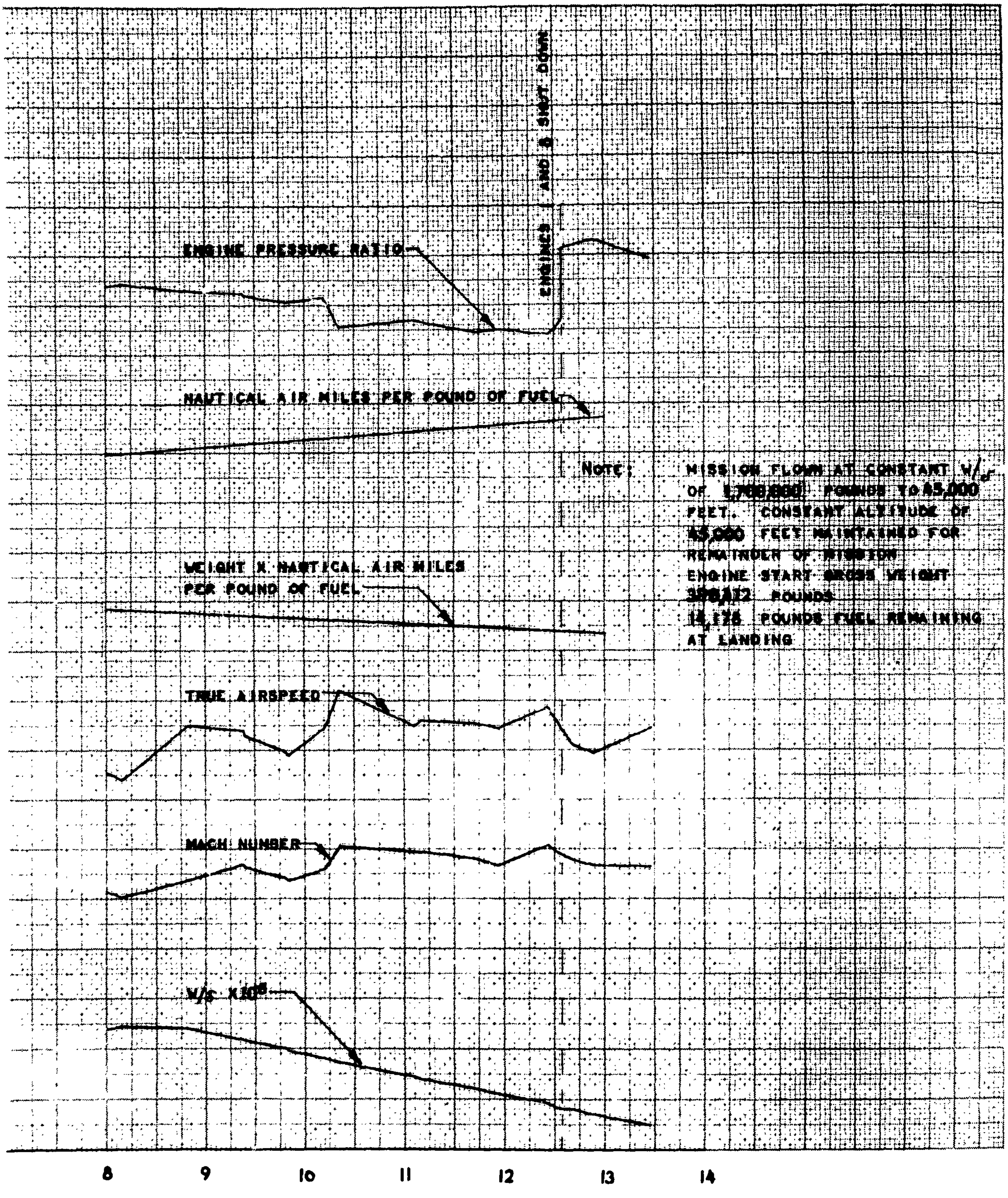
FIGURE NO. 80

SUMMARY OF RANGE DATA

B-52A, USAF NO. 52-003

EIGHT ENGINES; NO EXTERNAL TANKS




ENGINES AND SHUT DOWN
ENGINE PRESSURE RATIO
NAUTICAL AIR MILES PER POUND OF FUEL
NOTE:
MISSION FLOWN AT CONSTANT W/δ
OF POUNDS TO
FEET. CONSTANT ALTITUDE OF
FEET MAINTAINED FOR
REMAINDER OF MISSION
ENGINE START GROSS WEIGHT
POUNDS
POUNDS FUEL REMAINING
AT LANDING
WEIGHT X NAUTICAL AIR MILES
PER POUND OF FUEL
TRUE AIRSPEED
MACH NUMBER
W/δ X10
8
9
10
11
12
13
14

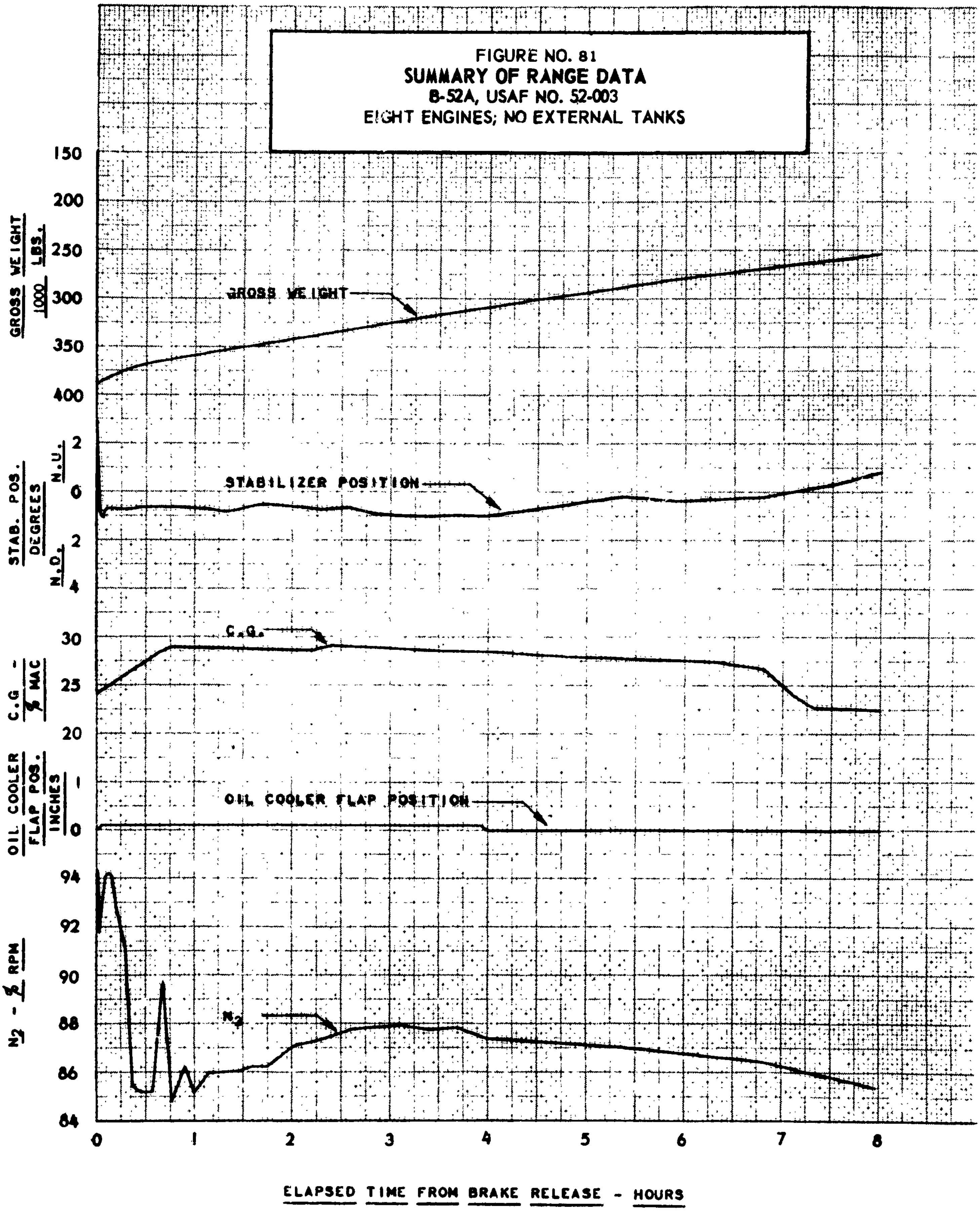
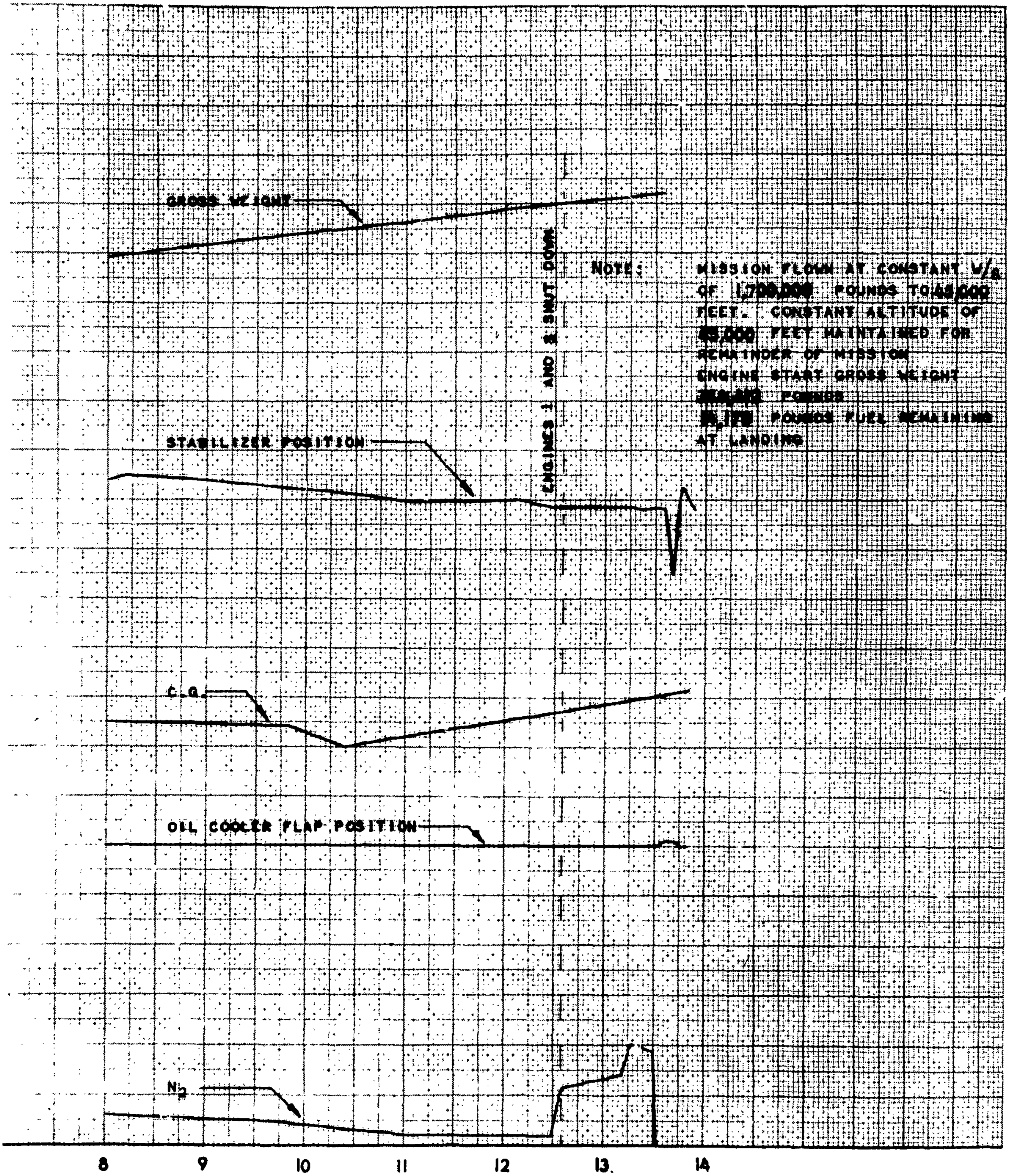


FIGURE NO. 81
SUMMARY OF RANGE DATA
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
GROSS WEIGHT 1000 LBS.
150
200
250
300
350
400
GROSS WEIGHT
STAB. POS. DEGREES
N.U.
N.D.
2
0
2
4
STABILIZER POSITION
C.G. - % MAC
30
25
20
C.G.
OIL COOLER FLAP POS. INCHES
1
0
OIL COOLER FLAP POSITION
N_2 - % RPM
94
92
90
88
86
84
N_2
0
1
2
3
4
5
6
7
8
ELAPSED TIME FROM BRAKE RELEASE - HOURS



ELAPSED TIME FROM BRAKE RELEASE - HOURS

FIGURE NO.82
SUMMARY OF RANGE DATA
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
SIMULATED ONE WAY
HIGH ALTITUDE MISSION

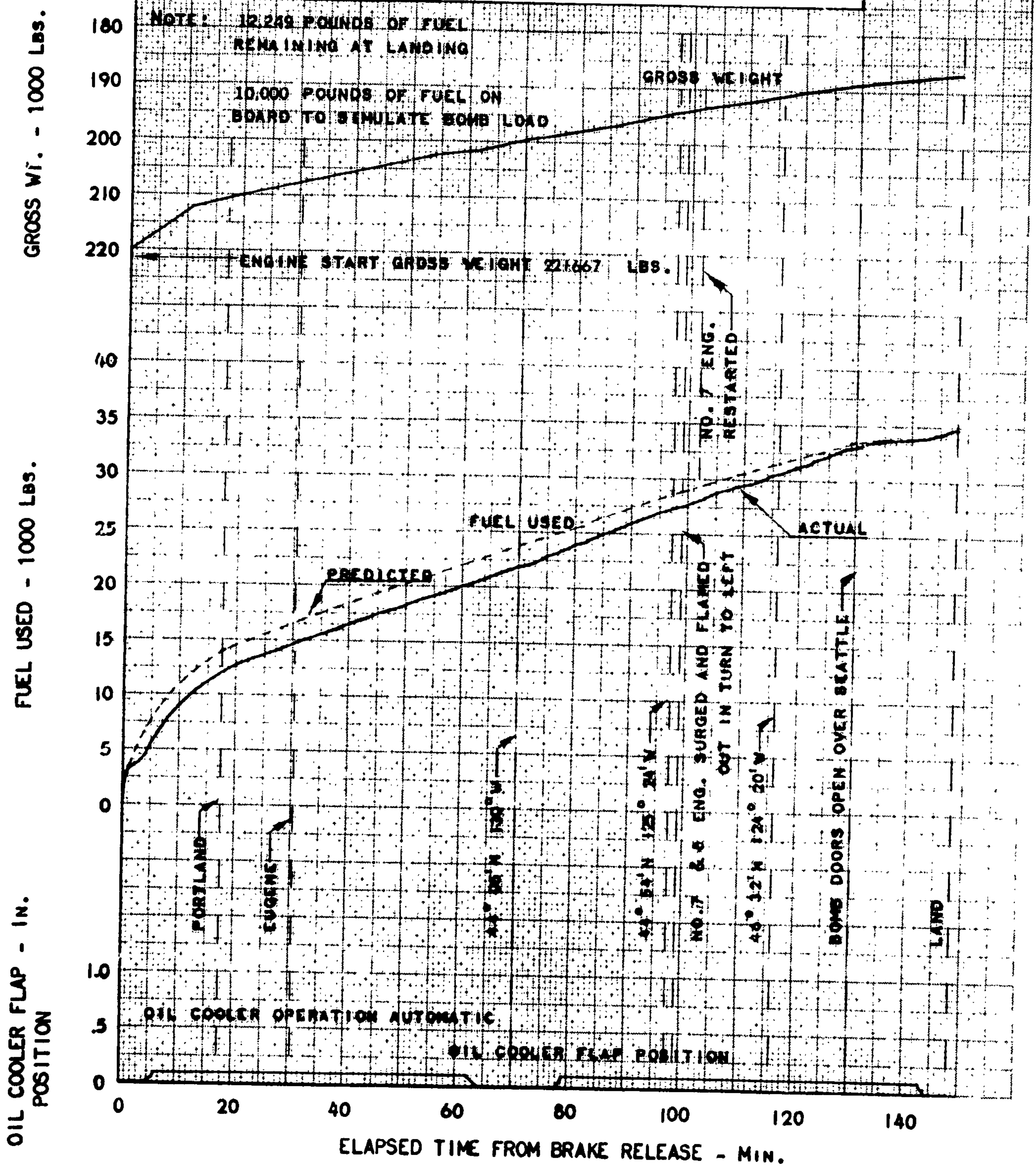
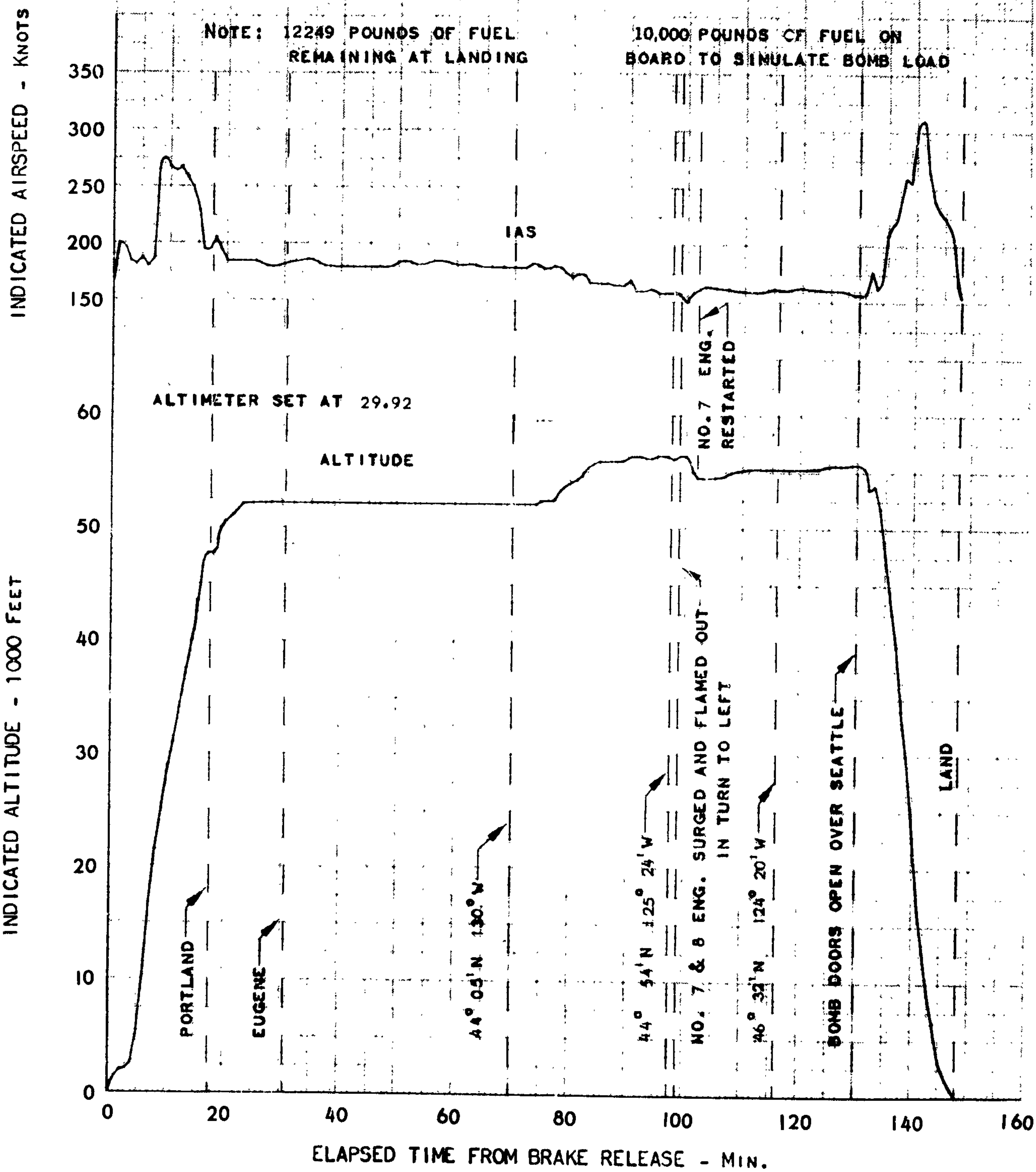


FIGURE NO. 83
SUMMARY OF RANGE DATA
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
SIMULATED ONE WAY
HIGH ALTITUDE MISSION



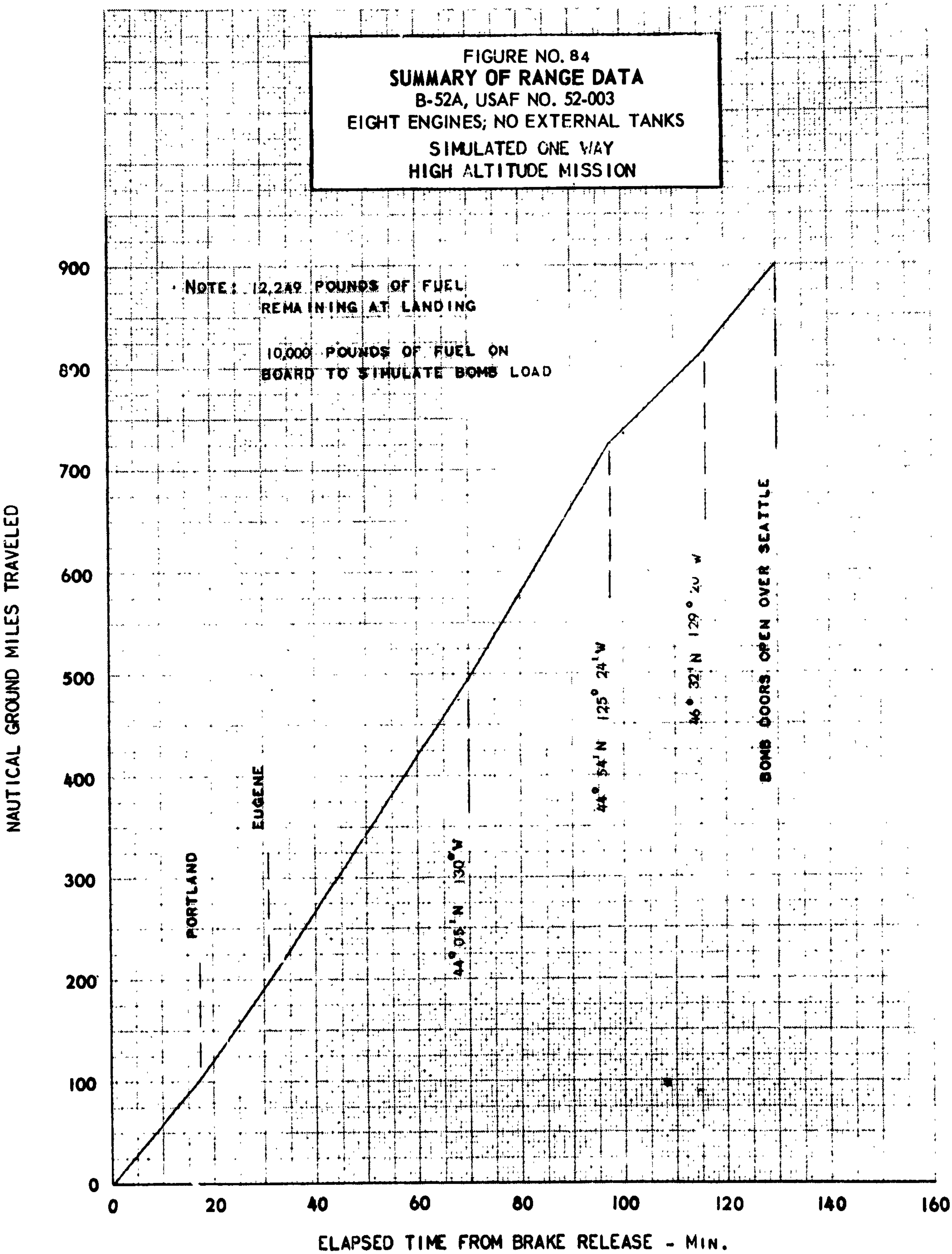
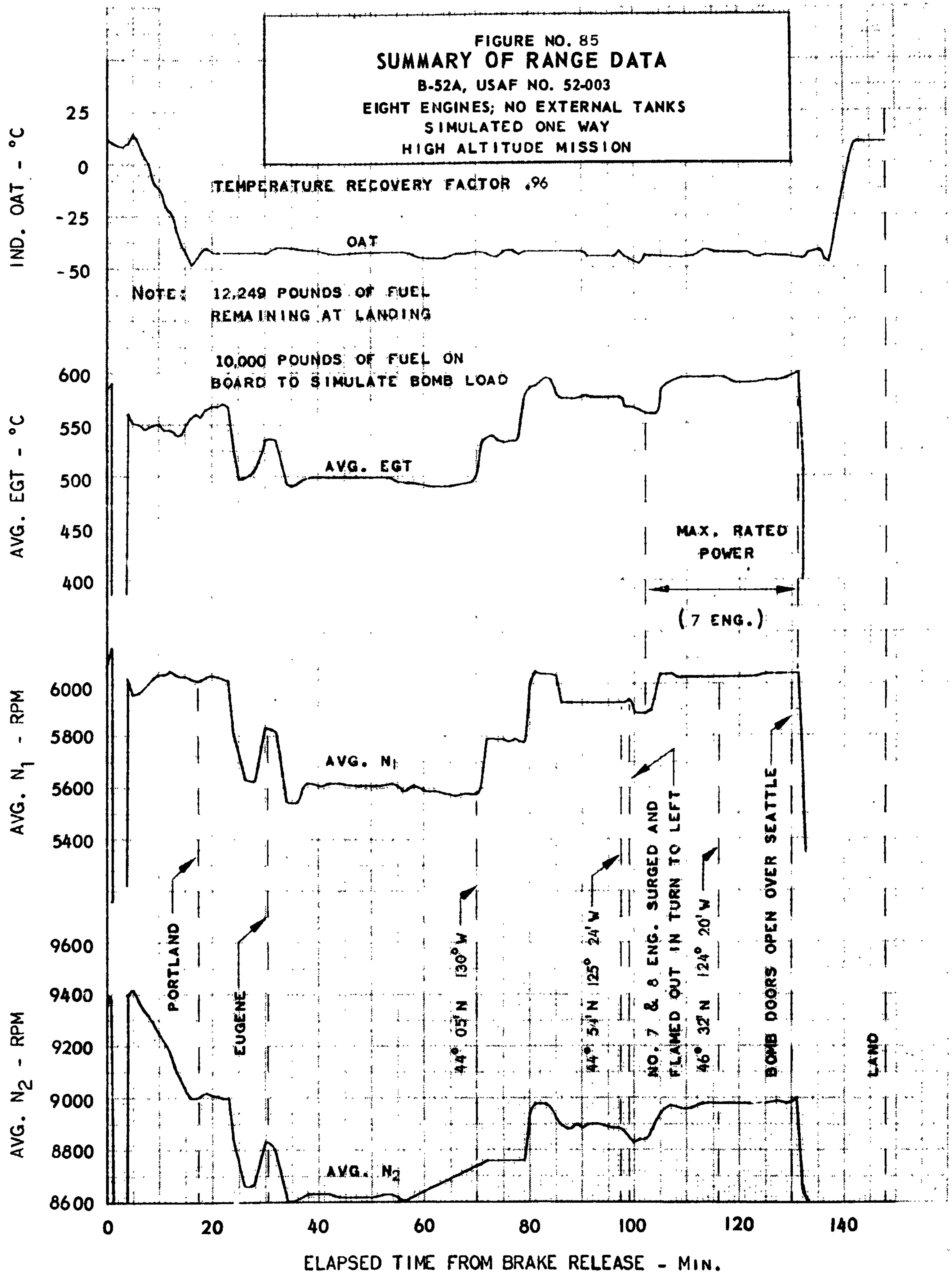


FIGURE NO. 84
SUMMARY OF RANGE DATA
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
SIMULATED ONE WAY
HIGH ALTITUDE MISSION
NOTE: 12,249 POUNDS OF FUEL
REMAINING AT LANDING
10,000 POUNDS OF FUEL ON
BOARD TO SIMULATE BOMB LOAD
PORTLAND
EUGENE
44° 05' N 130° W
44° 54' N 125° 24' W
46° 32' N 129° 20' W
BOMB DOORS OPEN OVER SEATTLE
NAUTICAL GROUND MILES TRAVELED
0
100
200
300
400
500
600
700
800
900
0
20
40
60
80
100
120
140
160
ELAPSED TIME FROM BRAKE RELEASE - MIN.

FIGURE NO. 85
SUMMARY OF RANGE DATA
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
SIMULATED ONE WAY
HIGH ALTITUDE MISSION



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FOR CONVENIENCE OF
PRESENTING PLOTS

POWER REQUIRED

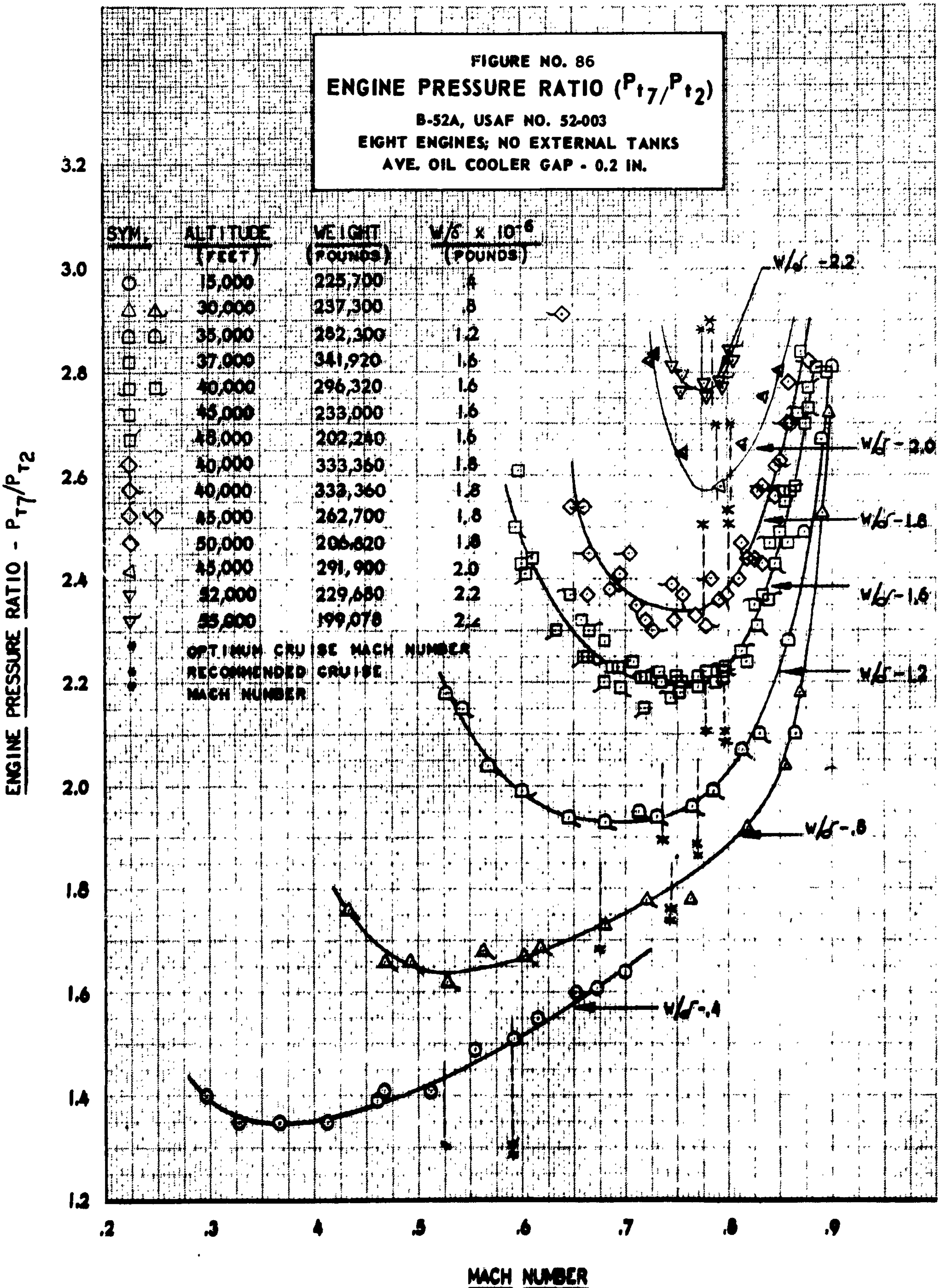


FIGURE NO. 86
ENGINE PRESSURE RATIO (P_{t_7}/P_{t_2})
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM. | ALTITUDE (FEET) | WEIGHT (POUNDS) | W/δ x 10^-6 (POUNDS)
15,000 | 225,700 | .4
30,000 | 237,300 | .8
35,000 | 282,300 | 1.2
37,000 | 341,920 | 1.6
40,000 | 296,320 | 1.6
45,000 | 233,000 | 1.6
48,000 | 202,240 | 1.6
40,000 | 333,360 | 1.8
40,000 | 333,360 | 1.8
45,000 | 262,700 | 1.8
50,000 | 206,820 | 1.8
45,000 | 291,900 | 2.0
52,000 | 229,680 | 2.2
55,000 | 199,078 | 2.4
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
W/δ - 2.2
W/δ - 2.0
W/δ - 1.8
W/δ - 1.6
W/δ - 1.2
W/δ - .8
W/δ - .4
ENGINE PRESSURE RATIO - P_{T7}/P_{T2}
MACH NUMBER
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
.2
.3
.4
.5
.6
.7
.8
.9

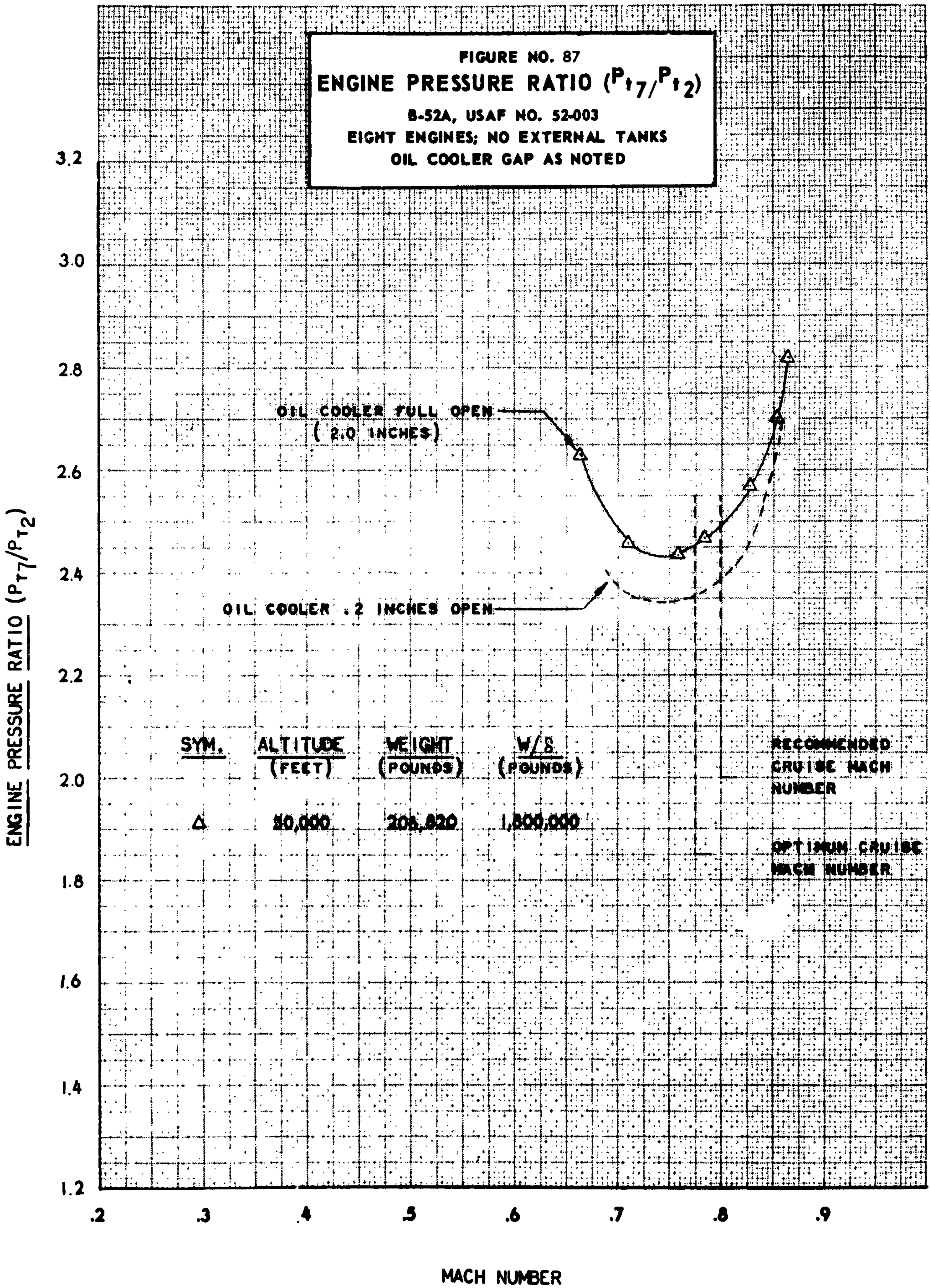


FIGURE NO. 87
ENGINE PRESSURE RATIO (P_{t7}/P_{t2})
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
OIL COOLER GAP AS NOTED

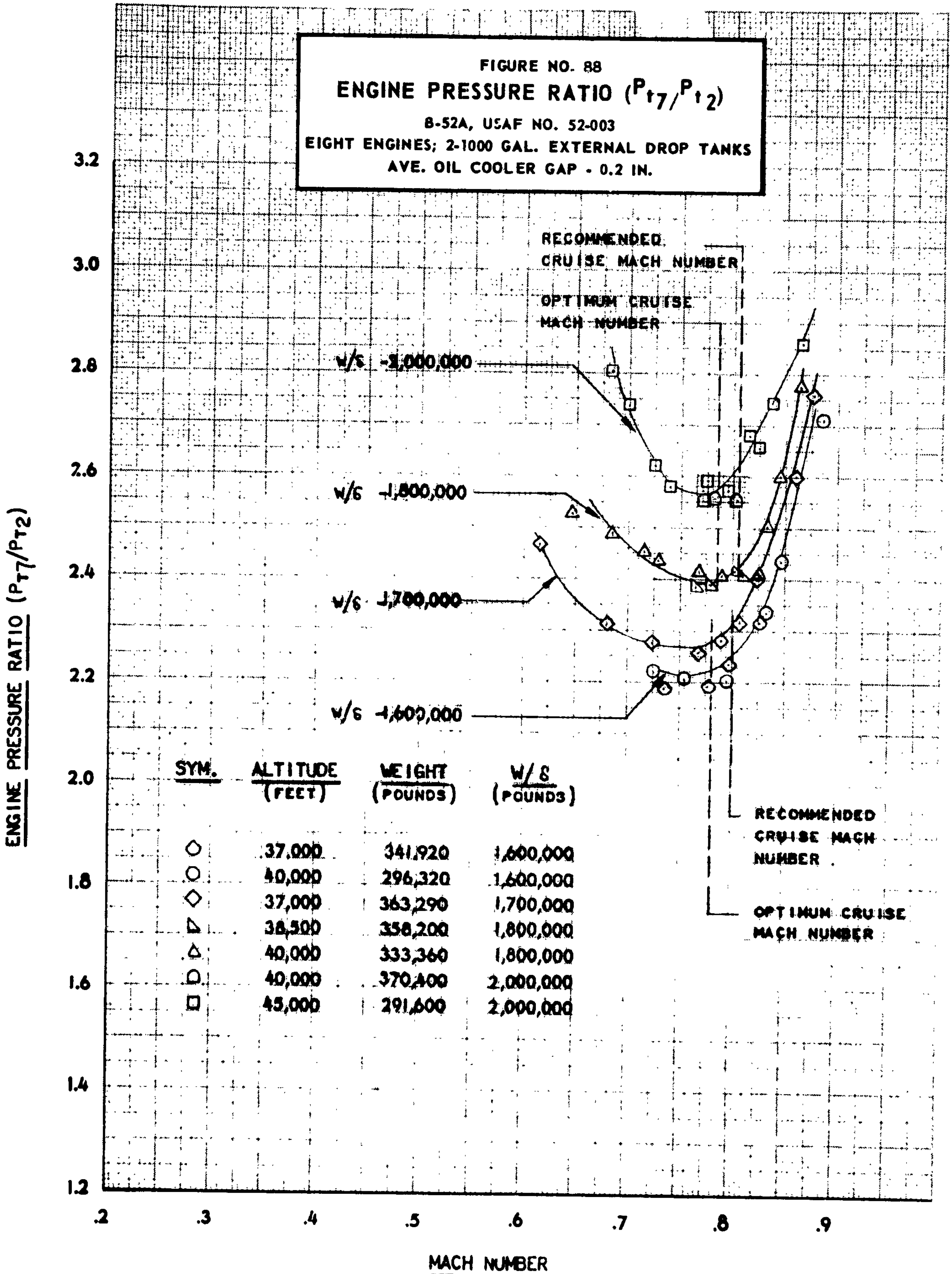


FIGURE NO. 88
ENGINE PRESSURE RATIO (P_{t7}/P_{t2})
B-52A, USAF NO. 52-003
EIGHT ENGINES; 2-1000 GAL. EXTERNAL DROP TANKS
AVE. OIL COOLER GAP - 0.2 IN.
RECOMMENDED CRUISE MACH NUMBER
OPTIMUM CRUISE MACH NUMBER
W/δ - 2,000,000
W/δ - 1,800,000
W/δ - 1,700,000
W/δ - 1,600,000
SYM. | ALTITUDE (FEET) | WEIGHT (POUNDS) | W/δ (POUNDS)
◇ | 37,000 | 341,920 | 1,600,000
○ | 40,000 | 296,320 | 1,600,000
◇ | 37,000 | 363,290 | 1,700,000
△ | 38,500 | 358,200 | 1,800,000
△ | 40,000 | 333,360 | 1,800,000
□ | 40,000 | 370,400 | 2,000,000
□ | 45,000 | 291,600 | 2,000,000
ENGINE PRESSURE RATIO (P_{T7}/P_{T2})
MACH NUMBER
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
.2
.3
.4
.5
.6
.7
.8
.9

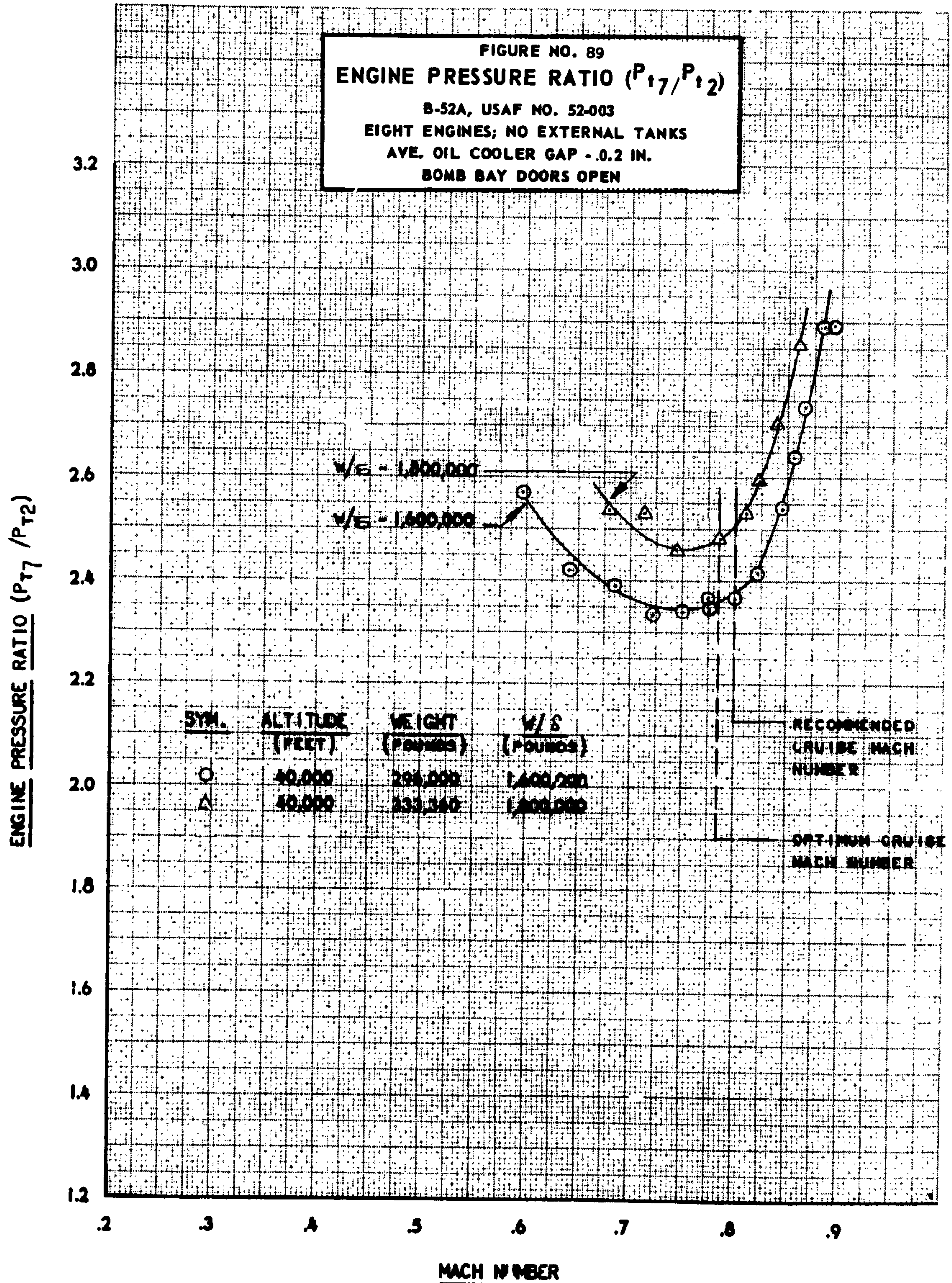


FIGURE NO. 89
ENGINE PRESSURE RATIO (P_{t7}/P_{t2})
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - .0.2 IN.
BOMB BAY DOORS OPEN
W/δ - 1,800,000
W/δ - 1,600,000
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
○ 40,000 296,000 1,600,000
△ 40,000 333,360 1,800,000
RECOMMENDED CRUISE MACH NUMBER
OPTIMUM CRUISE MACH NUMBER
ENGINE PRESSURE RATIO (P_{T7}/P_{T2})
MACH NUMBER
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
.2
.3
.4
.5
.6
.7
.8
.9

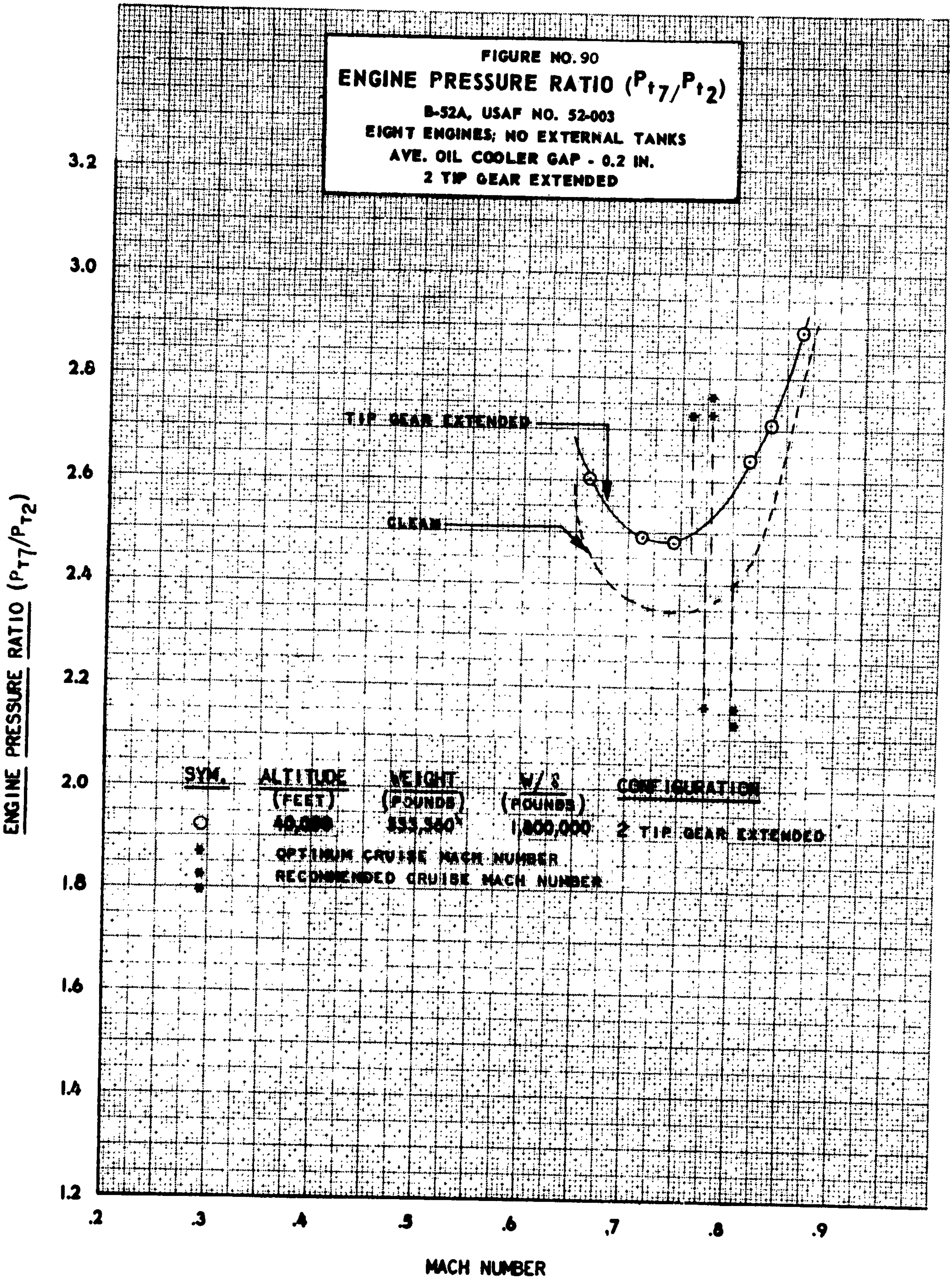


FIGURE NO. 90
ENGINE PRESSURE RATIO (P_{t7}/P_{t2})
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
2 TIP GEAR EXTENDED
TIP GEAR EXTENDED
CLEAN
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
CONFIGURATION
40,000
1,800,000
2 TIP GEAR EXTENDED
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
ENGINE PRESSURE RATIO (P_{T7}/P_{T2})
MACH NUMBER
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
.2
.3
.4
.5
.6
.7
.8
.9

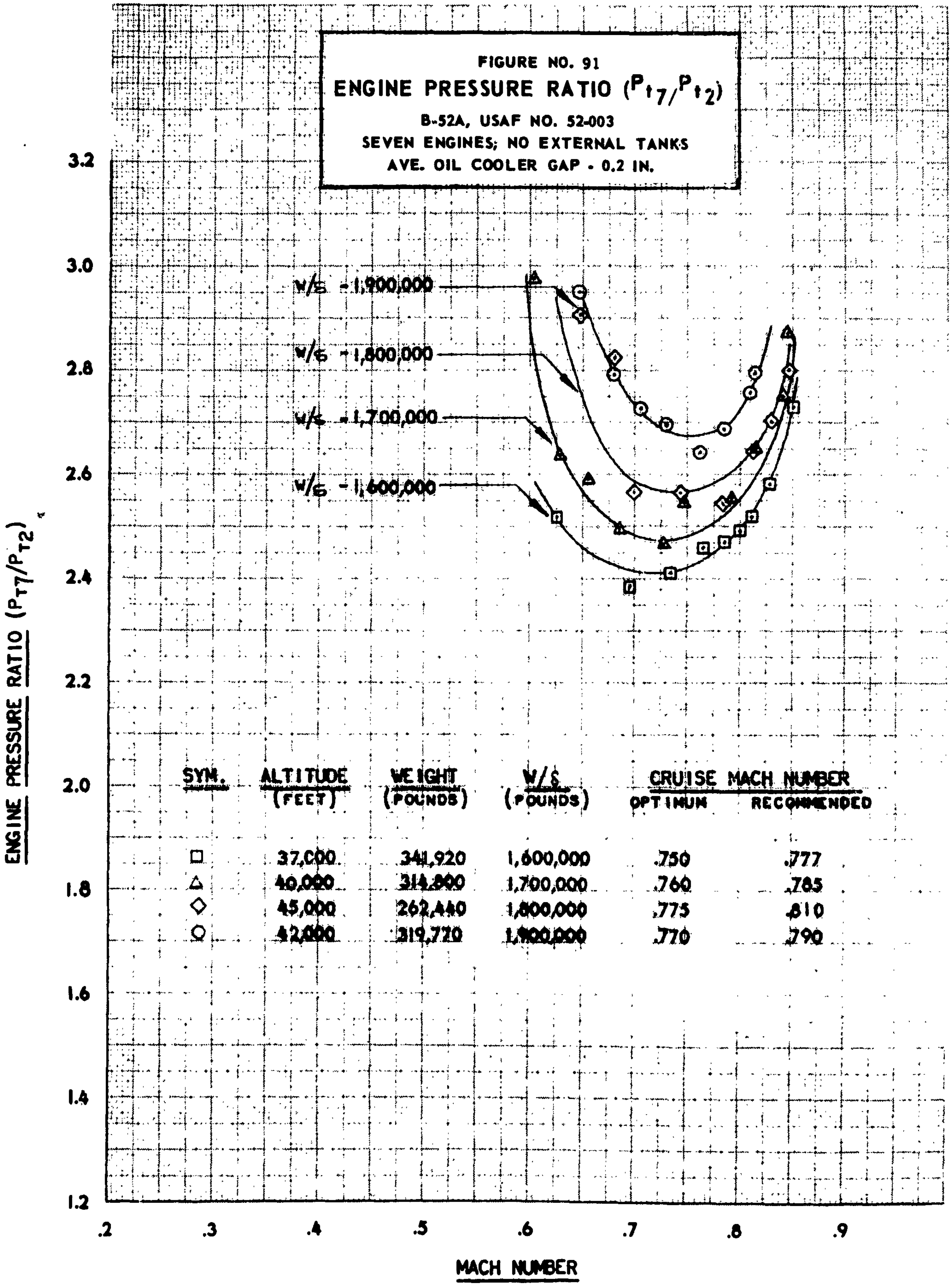
FIGURE NO. 91

ENGINE PRESSURE RATIO (P_{t_7}/P_{t_2})

B-52A, USAF NO. 52-003

SEVEN ENGINES; NO EXTERNAL TANKS

AVE. OIL COOLER GAP - 0.2 IN.



SYM.	ALTITUDE (FEET)	WEIGHT (POUNDS)	W/δ (POUNDS)	CRUISE MACH NUMBER OPTIMUM	CRUISE MACH NUMBER RECOMMENDED
□	37,000	341,920	1,600,000	.750	.777
△	40,000	314,800	1,700,000	.760	.785
◇	45,000	262,440	1,800,000	.775	.810
○	42,000	319,720	1,900,000	.770	.790

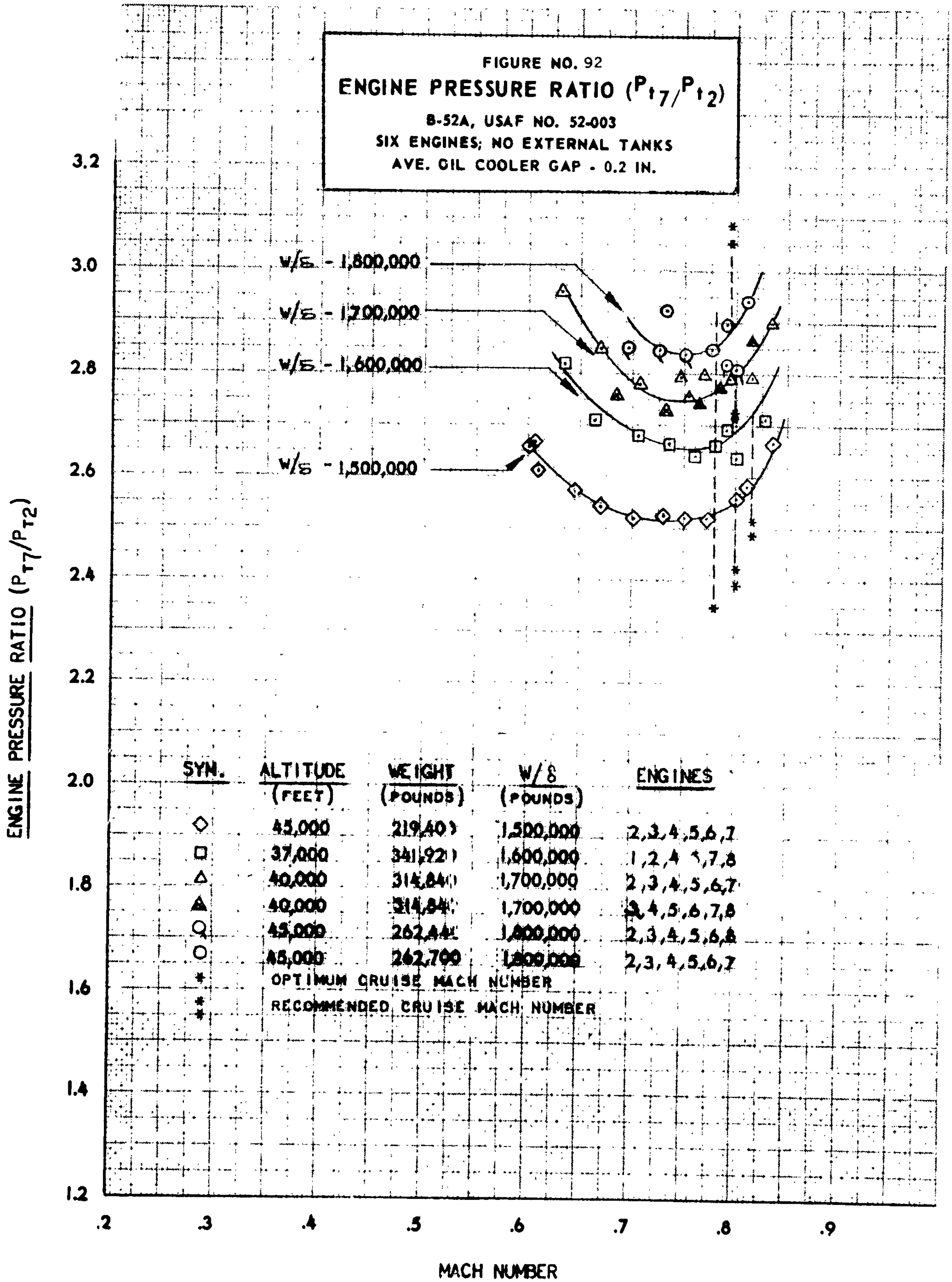


FIGURE NO. 92
ENGINE PRESSURE RATIO (P_{t_7}/P_{t_2})
B-52A, USAF NO. 52-003
SIX ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
W/δ - 1,800,000
W/δ - 1,700,000
W/δ - 1,600,000
W/δ - 1,500,000
ENGINE PRESSURE RATIO (P_{T7}/P_{T2})
MACH NUMBER
SYN.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
ENGINES
45,000
1,500,000
2,3,4,5,6,7
37,000
1,600,000
40,000
314,840
1,700,000
2,3,4,5,6,7
40,000
1,700,000
45,000
1,800,000
45,000
262,700
1,800,000
2,3,4,5,6,7
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER

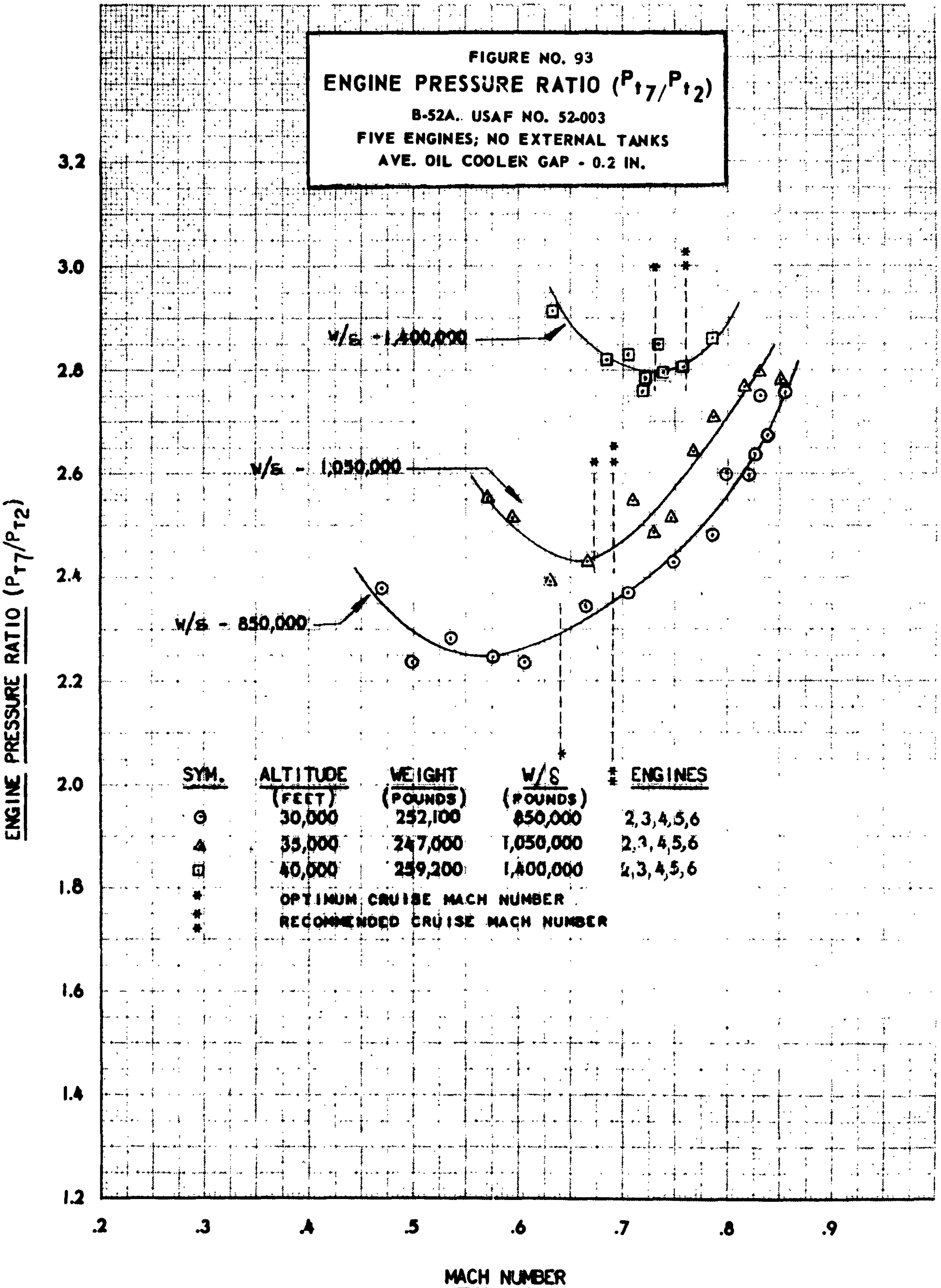


FIGURE NO. 93
ENGINE PRESSURE RATIO (P_{t_7}/P_{t_2})
B-52A. USAF NO. 52-003
FIVE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
W/δ - 1,400,000
W/δ - 1,050,000
W/δ - 850,000
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS) ENGINES
30,000 252,100 850,000 2,3,4,5,6
35,000 247,000 1,050,000 2,3,4,5,6
40,000 259,200 1,400,000 2,3,4,5,6
* OPTIMUM CRUISE MACH NUMBER
** RECOMMENDED CRUISE MACH NUMBER
ENGINE PRESSURE RATIO (P_{T_7}/P_{T_2})
MACH NUMBER
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
.2
.3
.4
.5
.6
.7
.8
.9

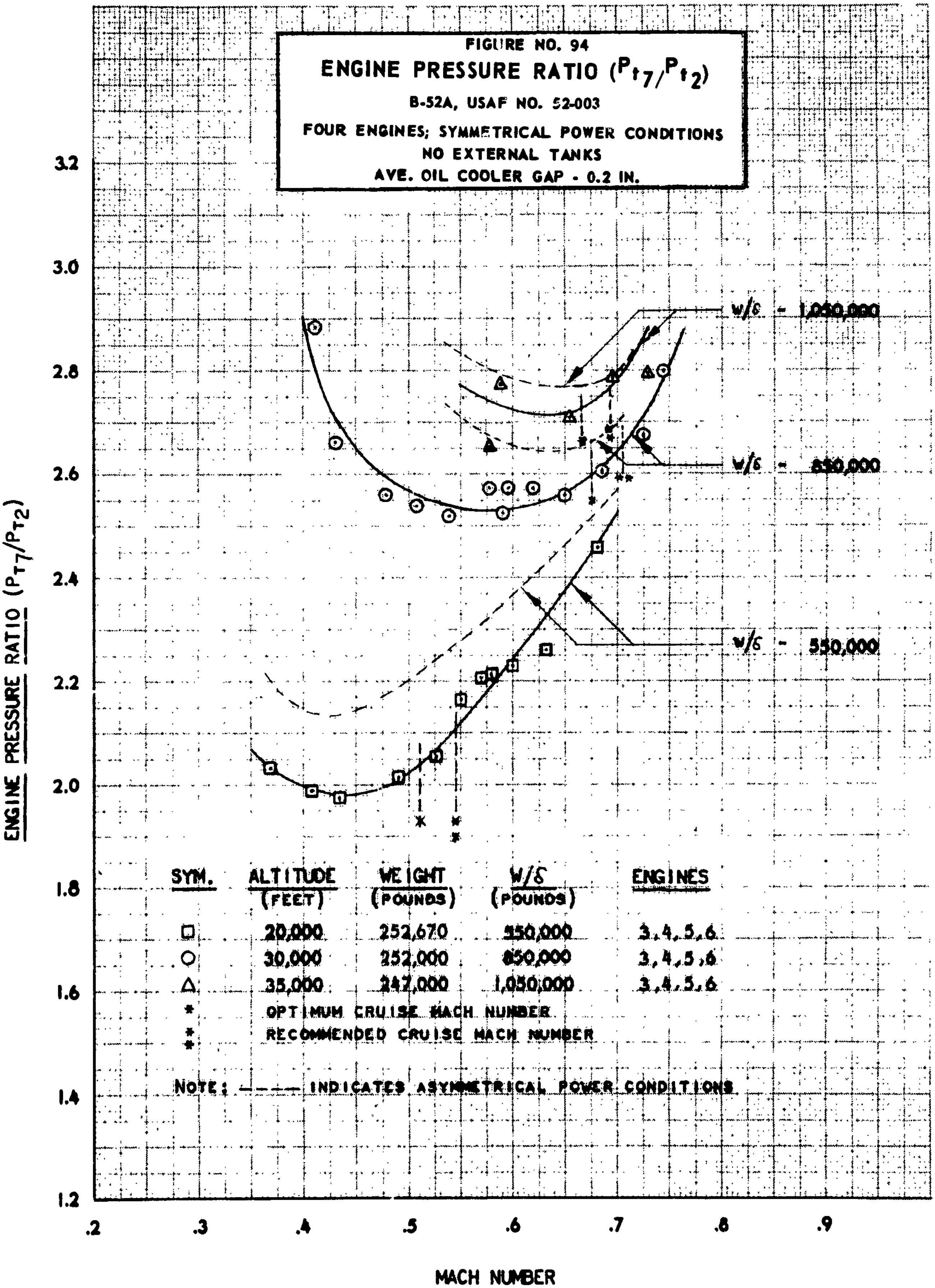


FIGURE NO. 94
ENGINE PRESSURE RATIO (P_{t_7}/P_{t_2})
B-52A, USAF NO. 52-003
FOUR ENGINES; SYMMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
W/δ - 1,050,000
W/δ - 850,000
W/δ - 550,000
ENGINE PRESSURE RATIO (P_{T_7}/P_{T_2})
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER
SYM. | ALTITUDE (FEET) | WEIGHT (POUNDS) | W/δ (POUNDS) | ENGINES
□ | 20,000 | 252,670 | 550,000 | 3,4,5,6
○ | 30,000 | 252,000 | 850,000 | 3,4,5,6
△ | 35,000 | 247,000 | 1,050,000 | 3,4,5,6
* OPTIMUM CRUISE MACH NUMBER
** RECOMMENDED CRUISE MACH NUMBER
NOTE: ---- INDICATES ASYMMETRICAL POWER CONDITIONS

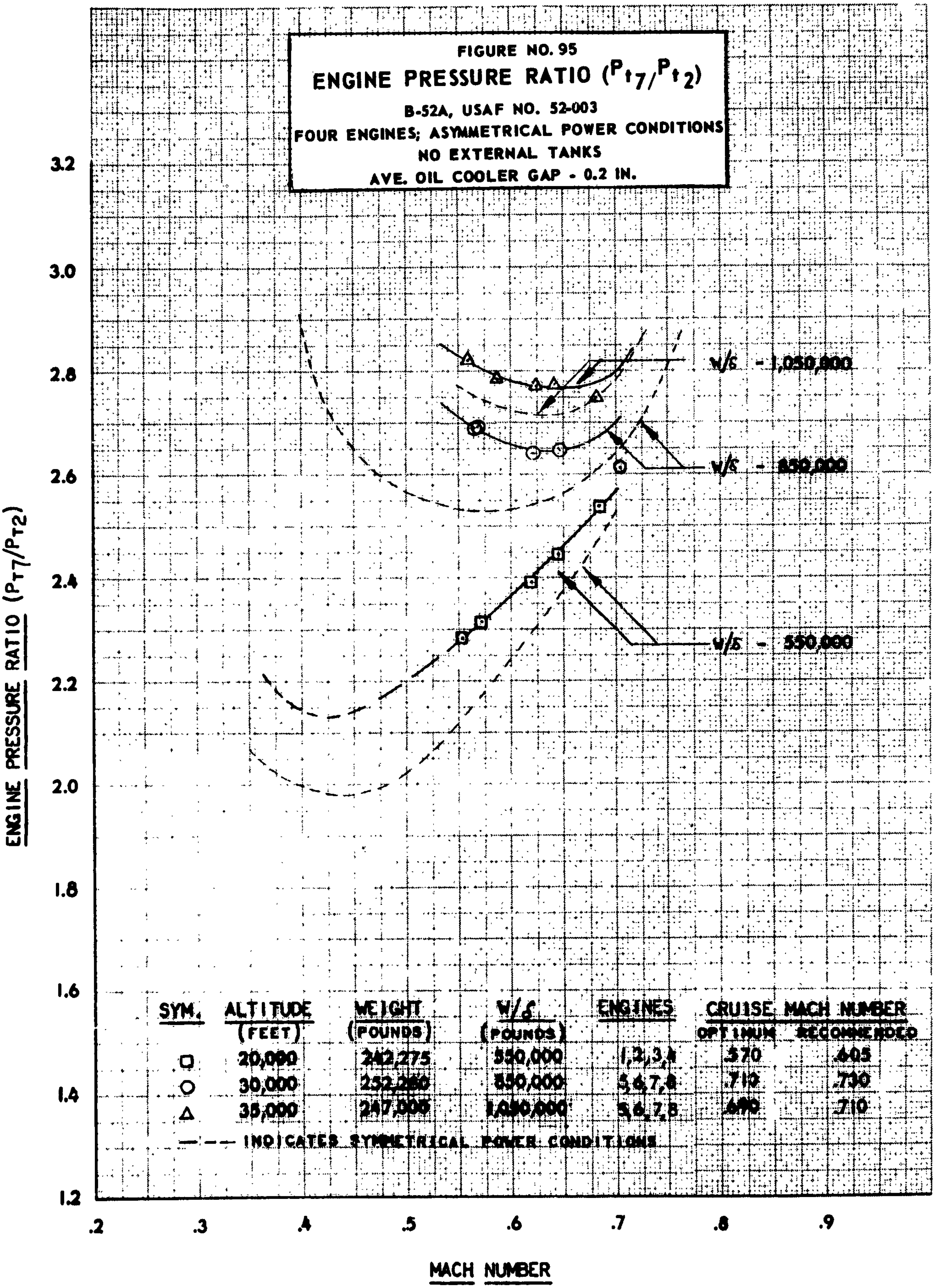


FIGURE NO. 95
ENGINE PRESSURE RATIO (P_{t7}/P_{t2})
B-52A, USAF NO. 52-003
FOUR ENGINES; ASYMMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

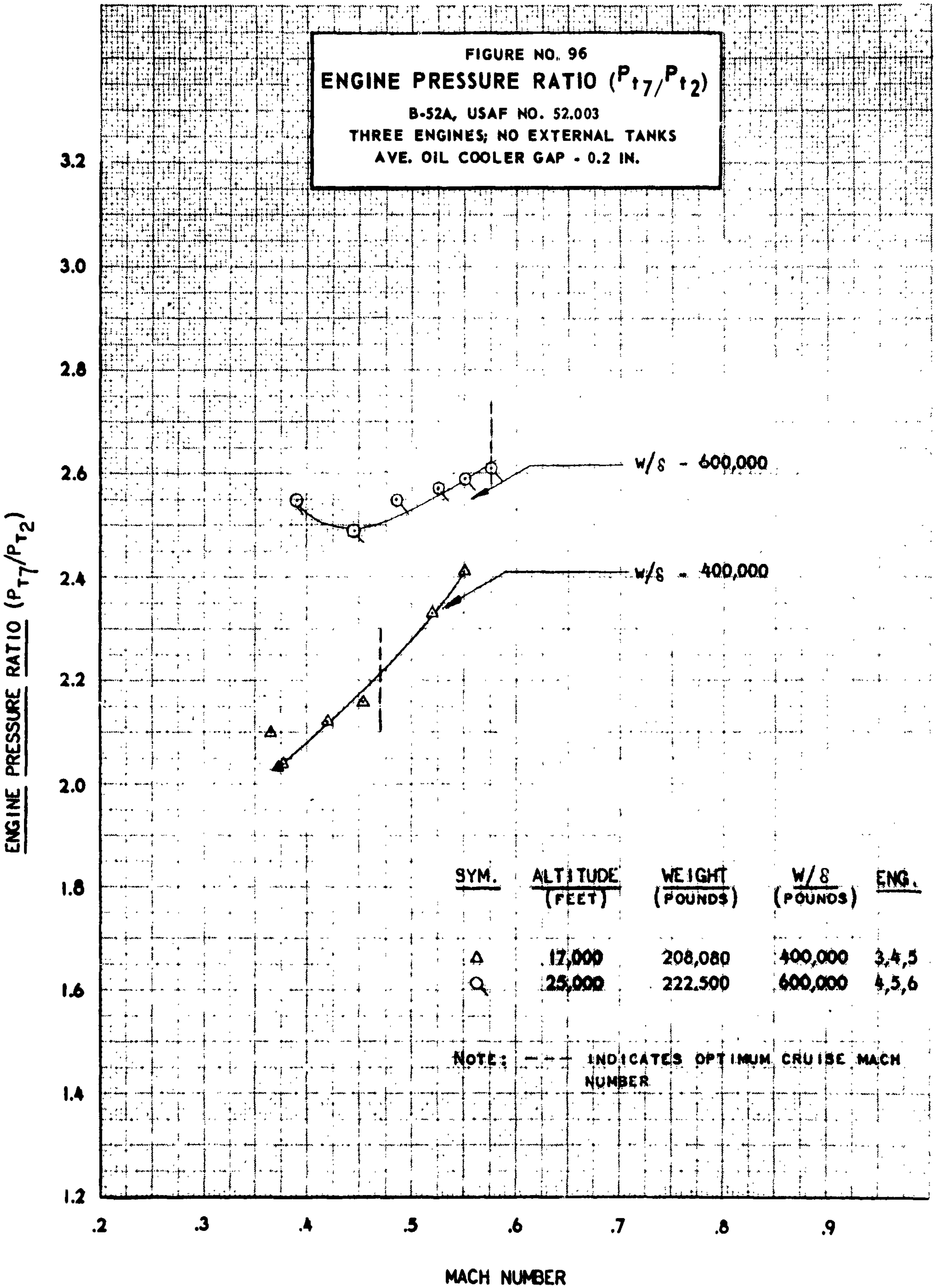


FIGURE NO. 96
ENGINE PRESSURE RATIO (P_{t7}/P_{t2})
B-52A, USAF NO. 52.003
THREE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
W/δ - 600,000
W/δ - 400,000
ENGINE PRESSURE RATIO (P_{T7}/P_{T2})
MACH NUMBER
SYM. | ALTITUDE (FEET) | WEIGHT (POUNDS) | W/δ (POUNDS) | ENG.
Δ | 17,000 | 208,080 | 400,000 | 3,4,5
⊙ | 25,000 | 222,500 | 600,000 | 4,5,6
NOTE: — — — INDICATES OPTIMUM CRUISE MACH NUMBER
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
.2
.3
.4
.5
.6
.7
.8
.9

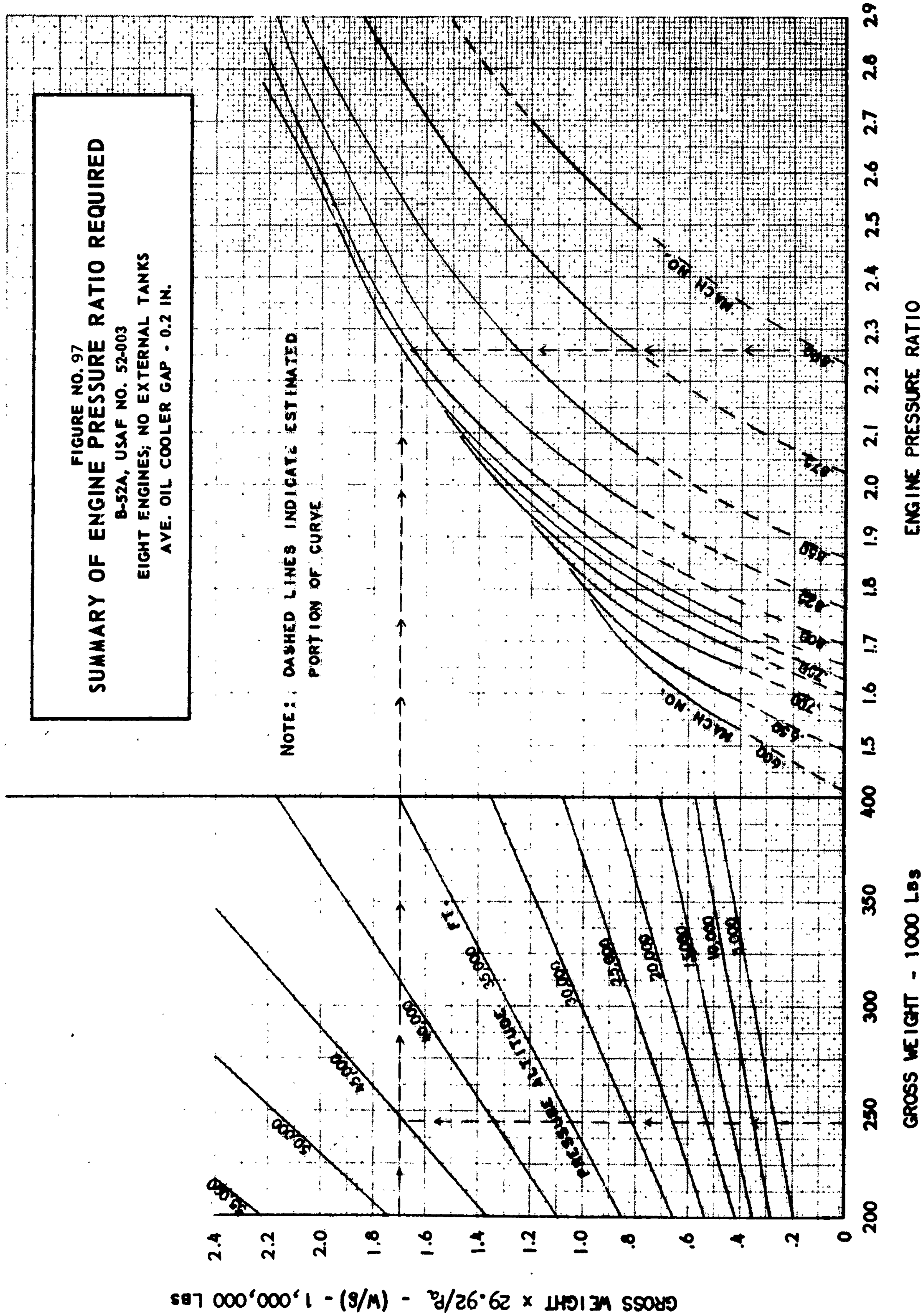


FIGURE NO. 97
SUMMARY OF ENGINE PRESSURE RATIO REQUIRED
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

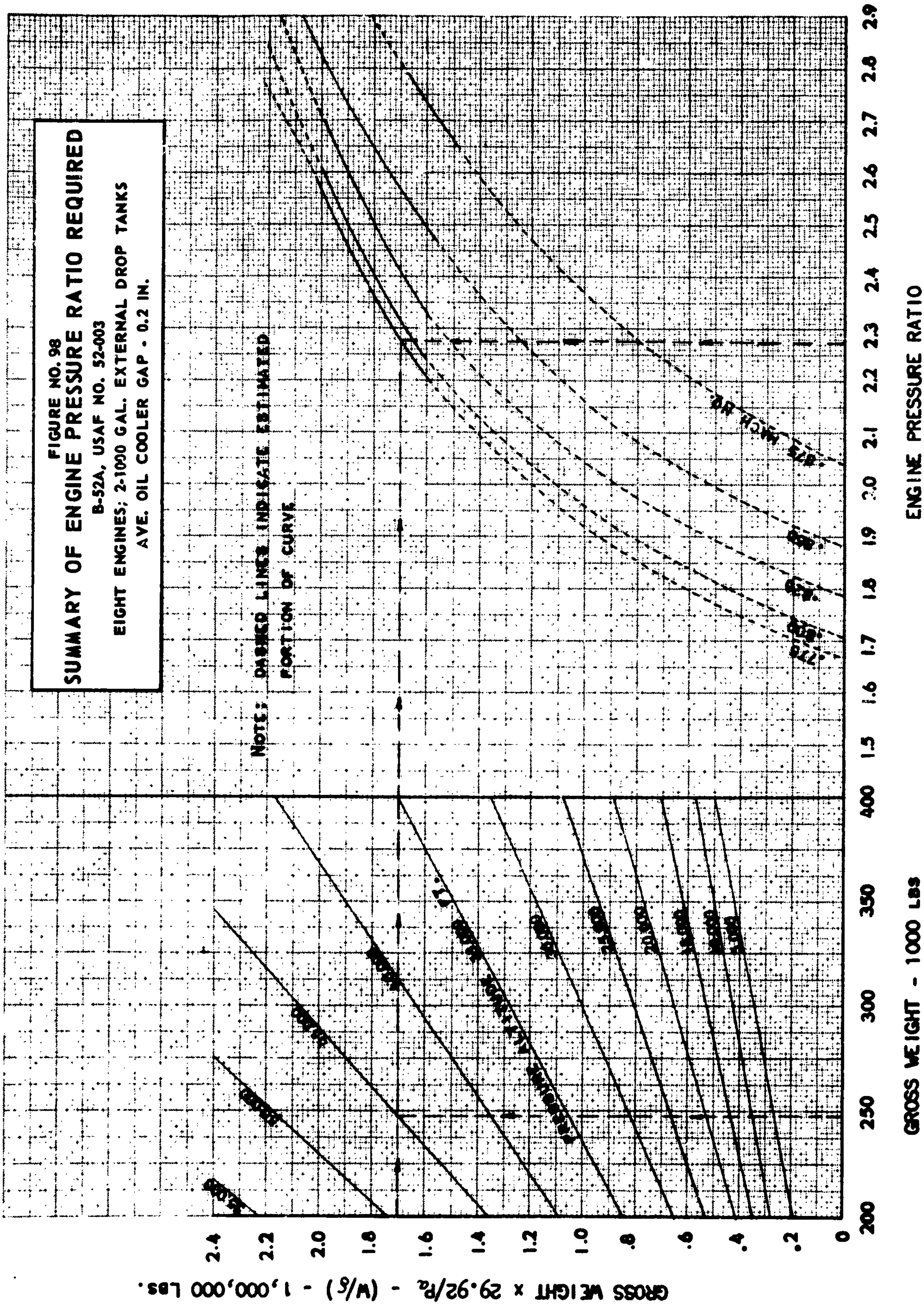


FIGURE NO. 98
SUMMARY OF ENGINE PRESSURE RATIO REQUIRED
B-52A, USAF NO. 52-003
EIGHT ENGINES; 2-1000 GAL. EXTERNAL DROP TANKS
AVE. OIL COOLER GAP - 0.2 IN.

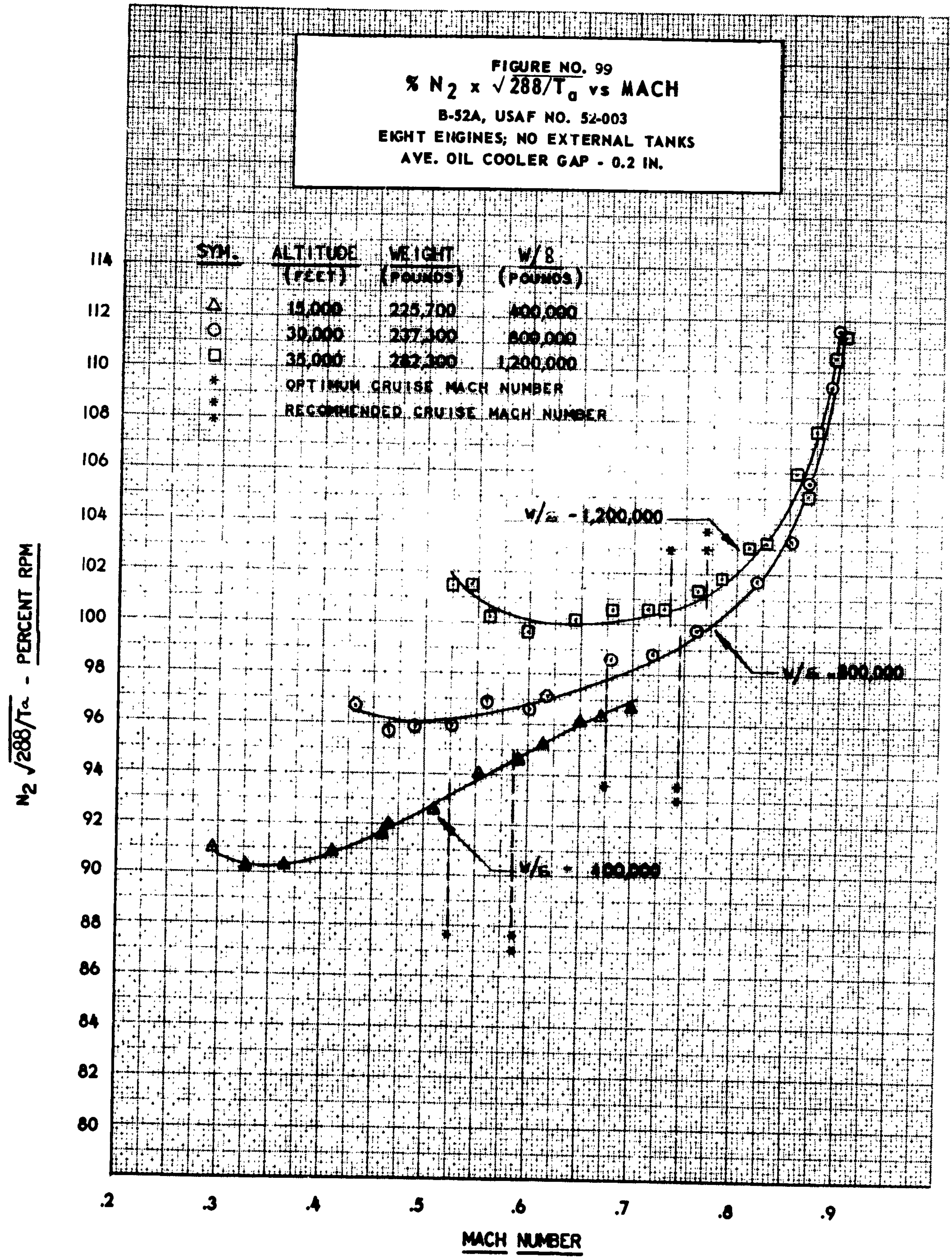


FIGURE NO. 99
% $N_2 \times \sqrt{288/T_a}$ vs MACH
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
15,000
225,700
400,000
30,000
237,300
800,000
35,000
282,300
1,200,000
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
W/δ - 1,200,000
W/δ - 800,000
W/δ - 400,000
$N_2 \sqrt{288/T_a}$ - PERCENT RPM
MACH NUMBER
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
.2
.3
.4
.5
.6
.7
.8
.9

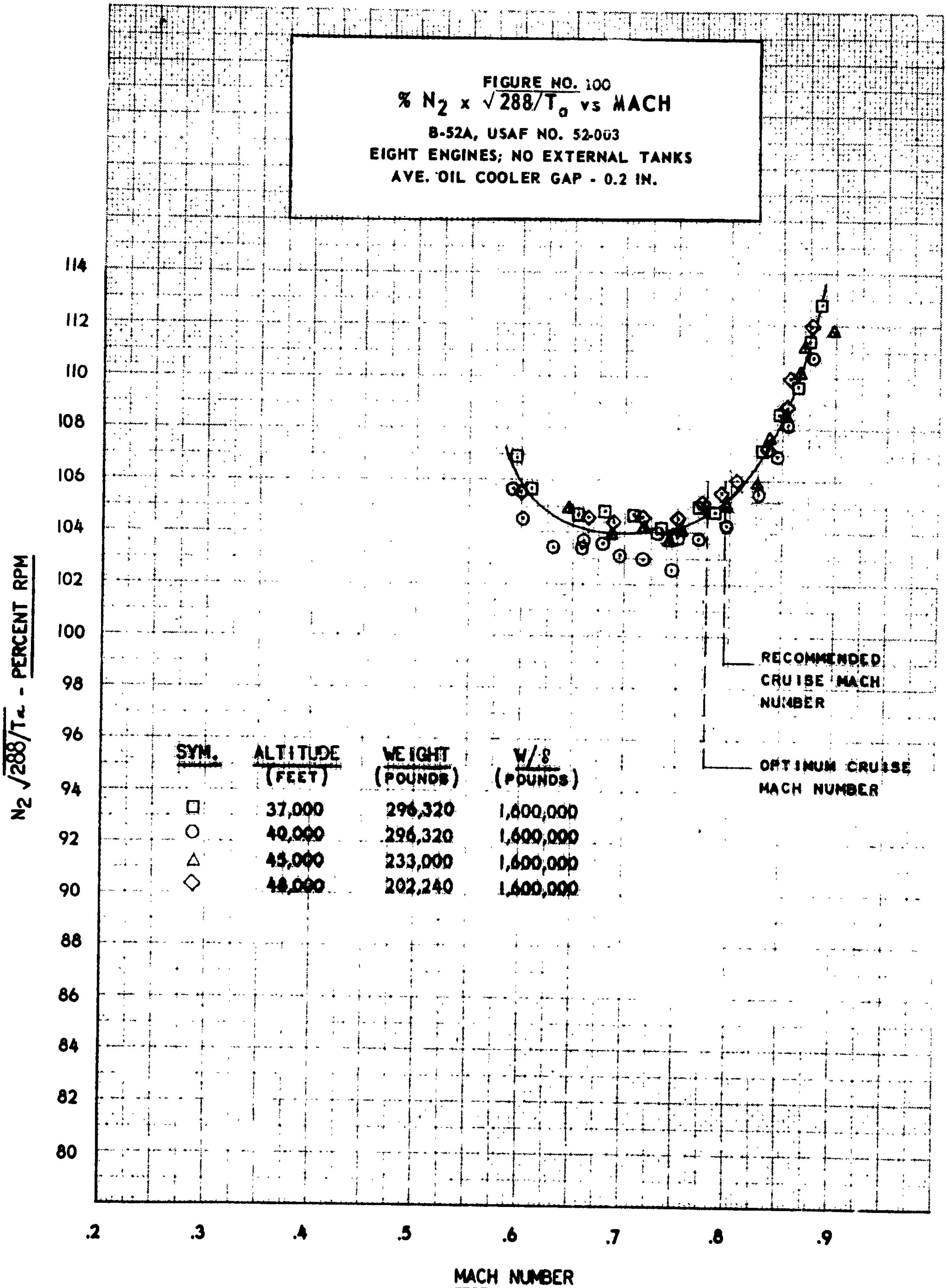
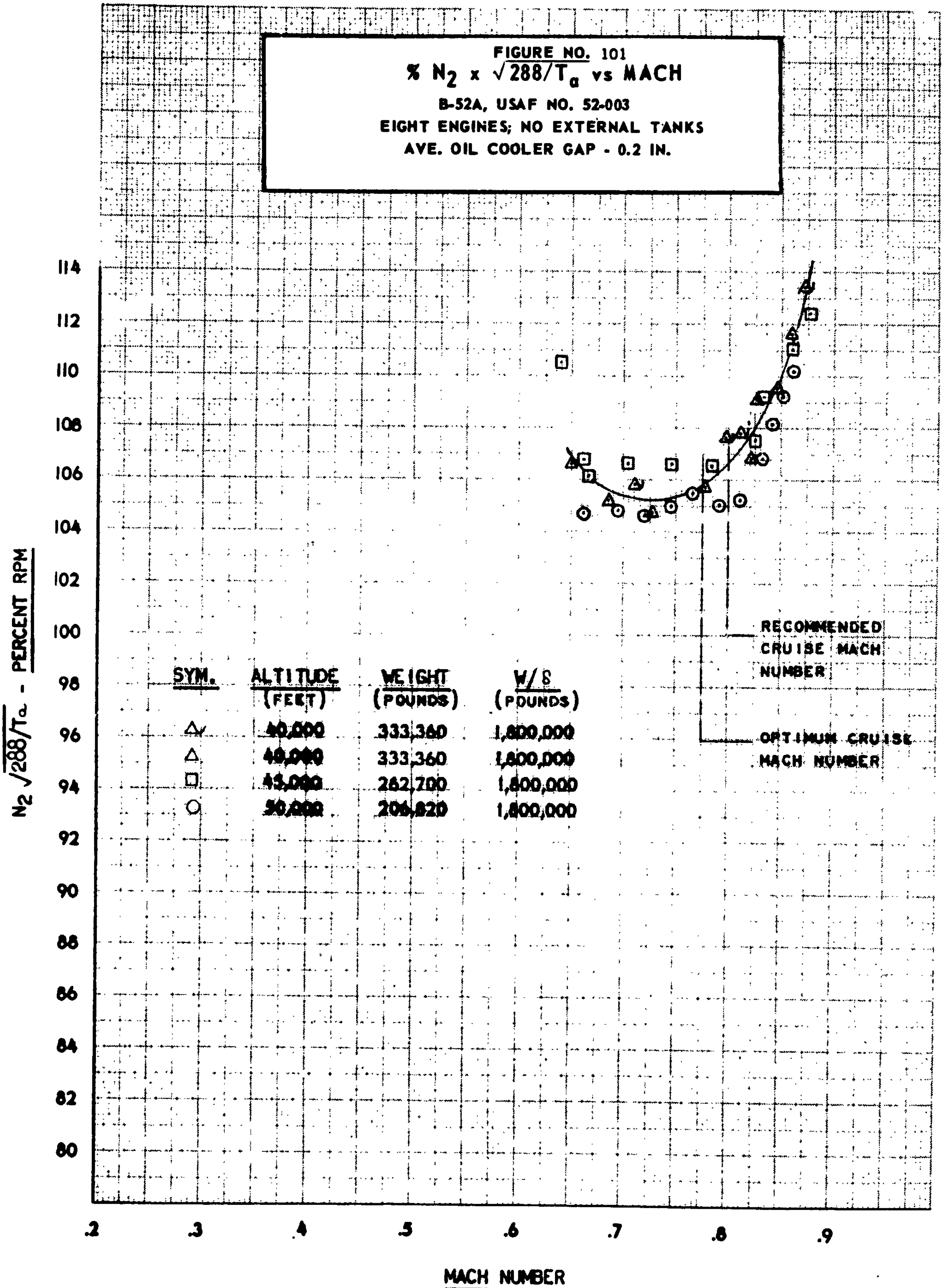
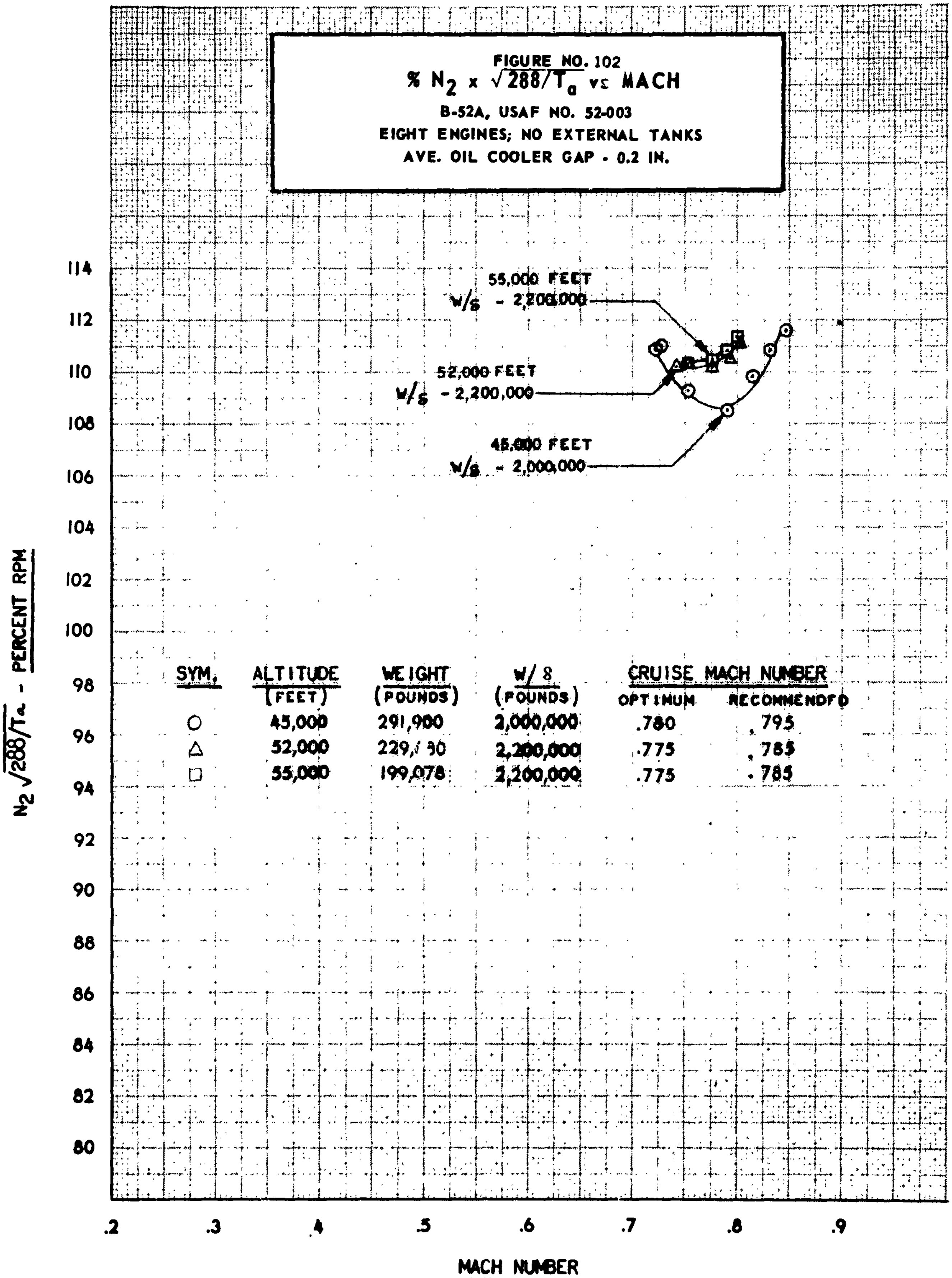


FIGURE NO. 100
% $N_2 \times \sqrt{288/T_a}$ vs MACH
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
$N_2 \sqrt{288/T_a}$ - PERCENT RPM
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
RECOMMENDED CRUISE MACH NUMBER
OPTIMUM CRUISE MACH NUMBER
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
□ 37,000 296,320 1,600,000
○ 40,000 296,320 1,600,000
△ 45,000 233,000 1,600,000
◇ 48,000 202,240 1,600,000
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER



SYM.	ALTITUDE (FEET)	WEIGHT (POUNDS)	W/δ (POUNDS)
△✓	40,000	333,360	1,800,000
△	40,000	333,360	1,800,000
□	45,000	262,700	1,800,000
○	50,000	206,820	1,800,000



SYM.	ALTITUDE (FEET)	WEIGHT (POUNDS)	W/δ (POUNDS)	CRUISE MACH NUMBER OPTIMUM	CRUISE MACH NUMBER RECOMMENDED
○	45,000	291,900	2,000,000	.780	.795
△	52,000	229,·30	2,200,000	.775	.785
□	55,000	199,078	2,200,000	.775	.785

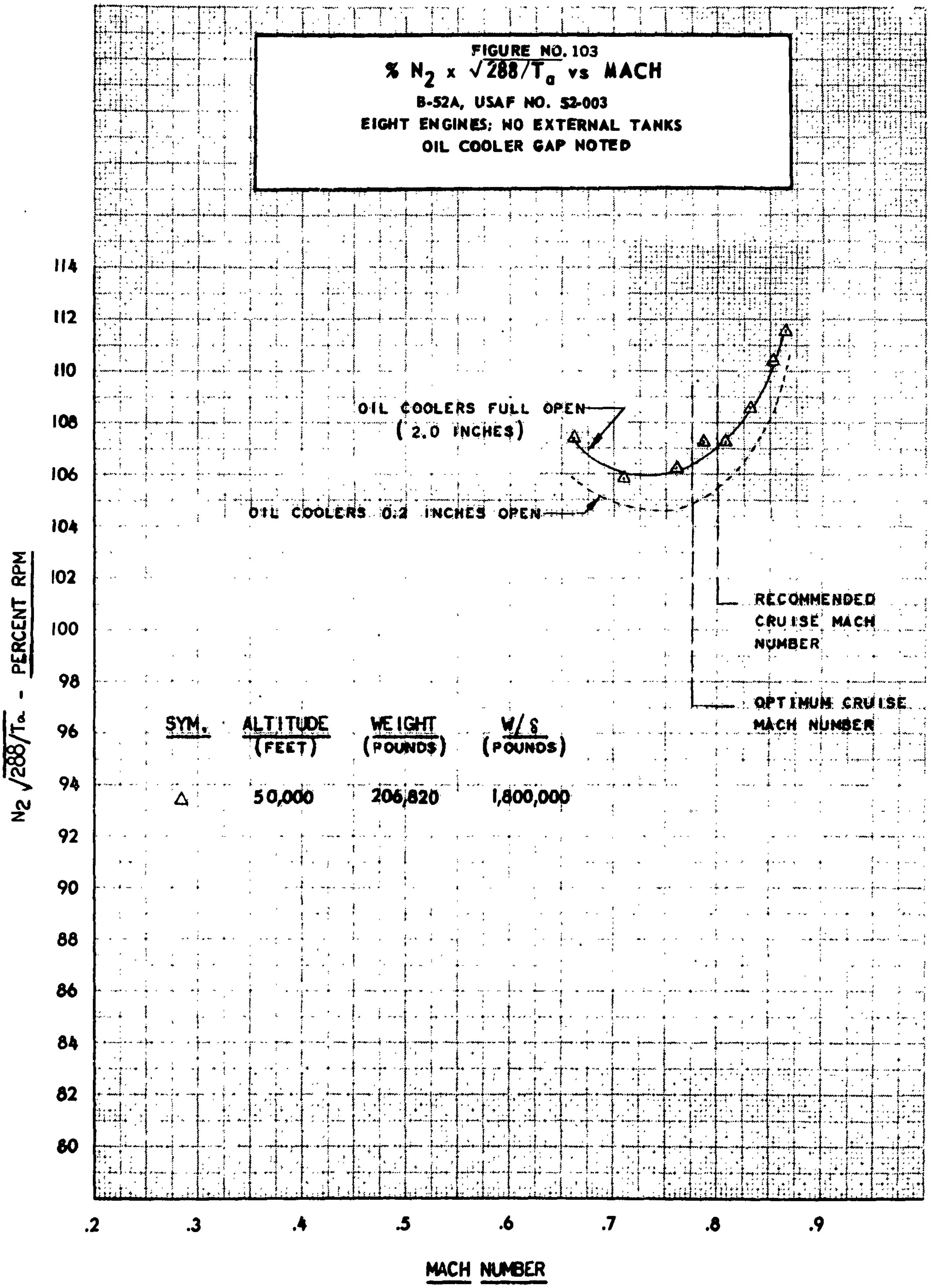


FIGURE NO. 103
% N_2 x $\sqrt{288/T_a}$ vs MACH
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
OIL COOLER GAP NOTED
OIL COOLERS FULL OPEN (2.0 INCHES)
OIL COOLERS 0.2 INCHES OPEN
RECOMMENDED CRUISE MACH NUMBER
OPTIMUM CRUISE MACH NUMBER
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
△
50,000
206,820
1,800,000
$N_2 \sqrt{288/T_a}$ - PERCENT RPM
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

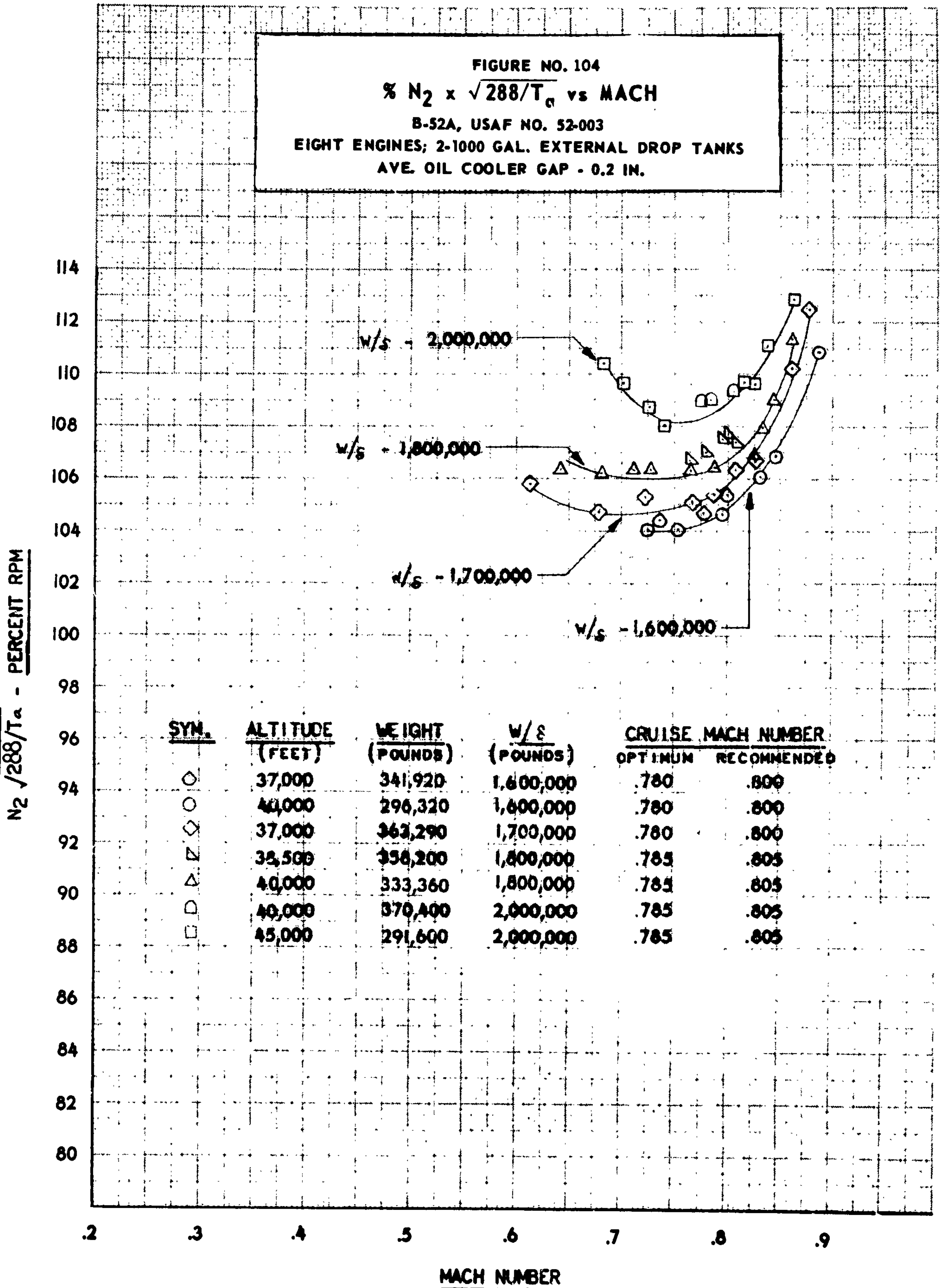
FIGURE NO. 104

% $N_2 \times \sqrt{288/T_a}$ vs MACH

B-52A, USAF NO. 52-003

EIGHT ENGINES; 2-1000 GAL. EXTERNAL DROP TANKS

AVE. OIL COOLER GAP - 0.2 IN.



SYM.	ALTITUDE (FEET)	WEIGHT (POUNDS)	W/δ (POUNDS)	CRUISE MACH NUMBER OPTIMUM	CRUISE MACH NUMBER RECOMMENDED
◇ (flagged)	37,000	341,920	1,600,000	.780	.800
○	40,000	296,320	1,600,000	.780	.800
◇	37,000	363,290	1,700,000	.780	.800
△ (flagged)	35,500	358,200	1,800,000	.785	.805
△	40,000	333,360	1,800,000	.785	.805
□ (flagged)	40,000	370,400	2,000,000	.785	.805
□	45,000	291,600	2,000,000	.785	.805

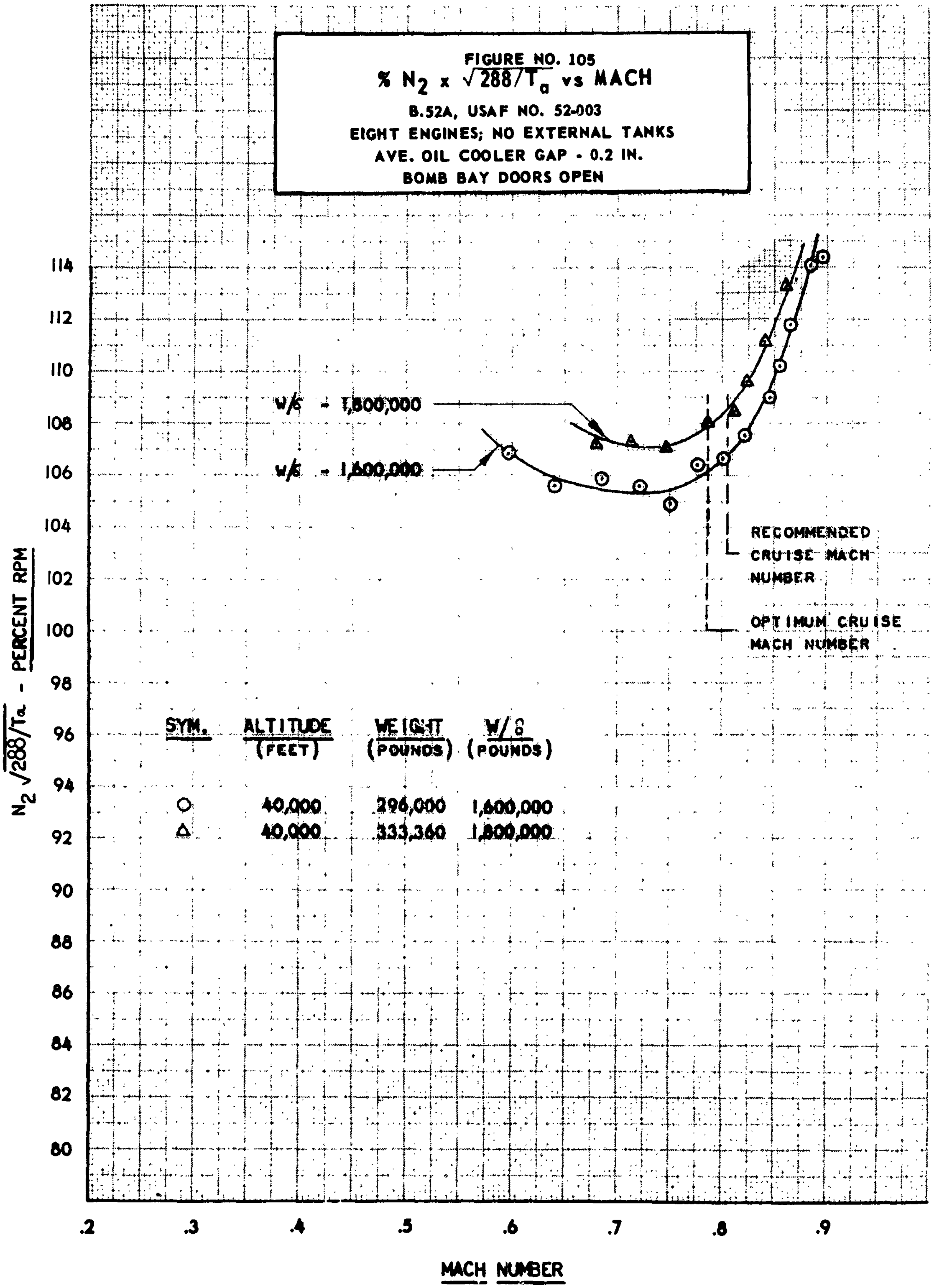


FIGURE NO. 105
% $N_2 \times \sqrt{288/T_a}$ vs MACH
B.52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
BOMB BAY DOORS OPEN
W/δ - 1,800,000
W/δ - 1,600,000
RECOMMENDED CRUISE MACH NUMBER
OPTIMUM CRUISE MACH NUMBER
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
○ 40,000 296,000 1,600,000
△ 40,000 333,360 1,800,000
$N_2 \sqrt{288/T_a}$ - PERCENT RPM
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

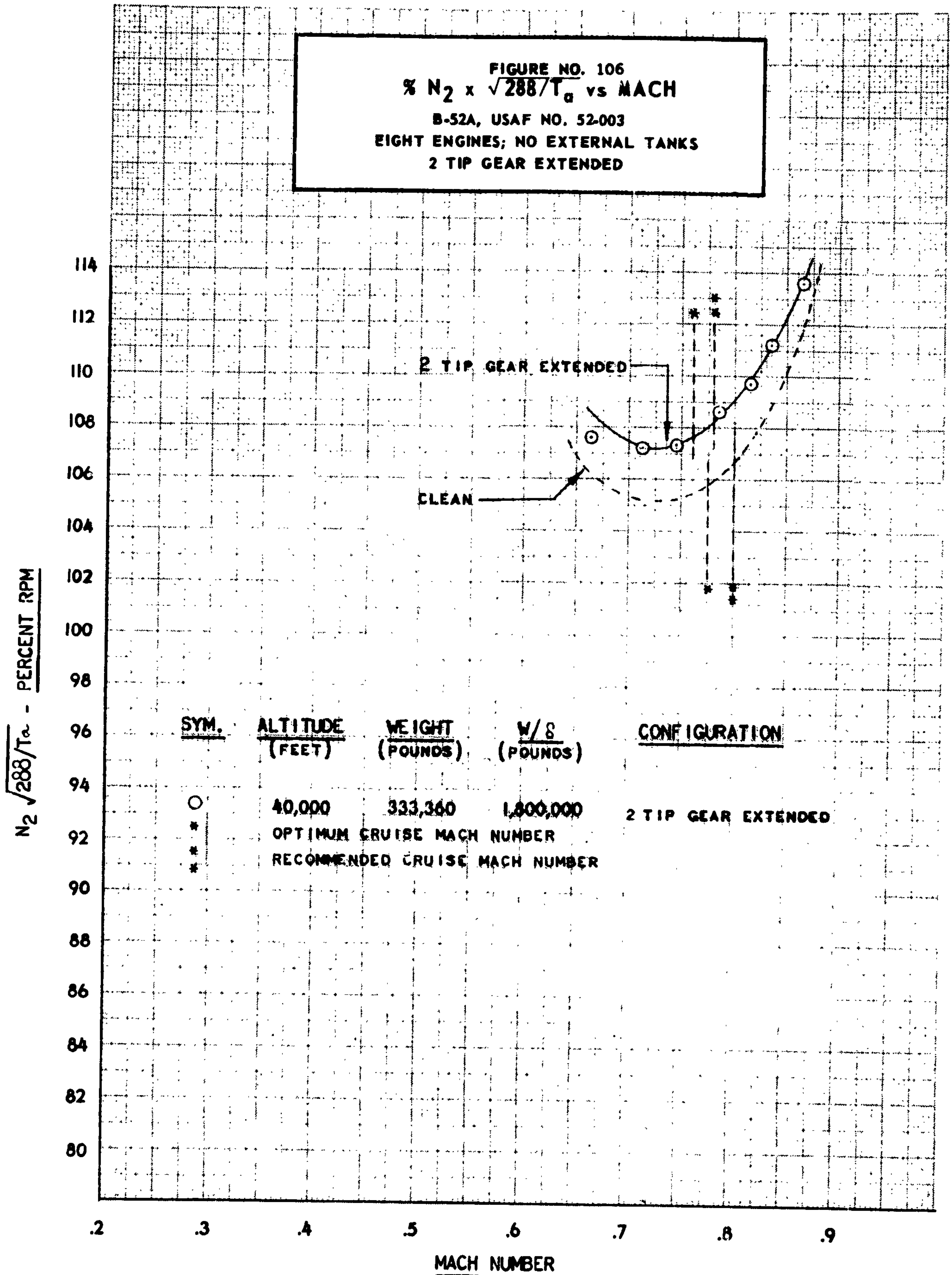
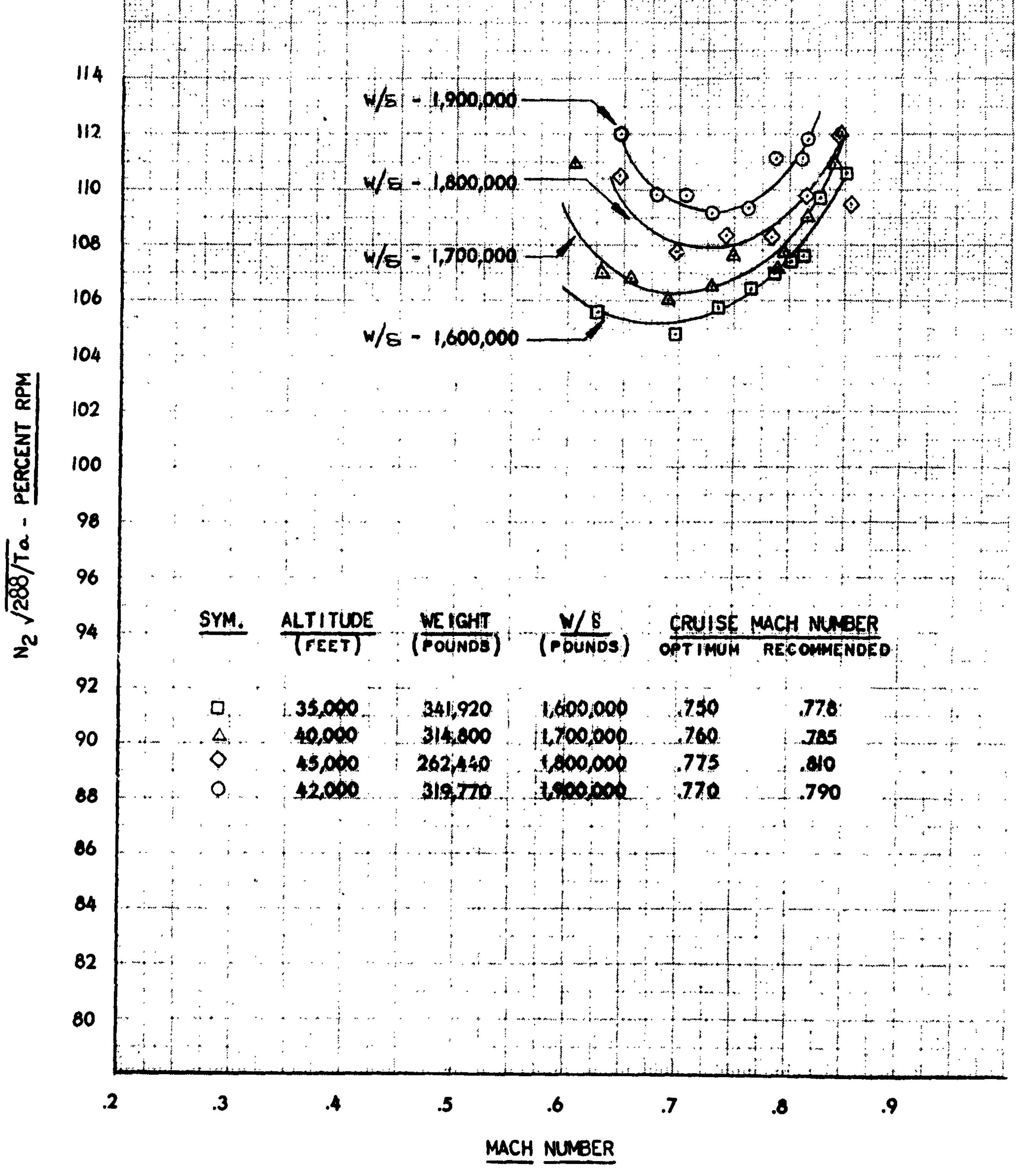


FIGURE NO. 106
% $N_2 \times \sqrt{288/T_a}$ vs MACH
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
2 TIP GEAR EXTENDED
2 TIP GEAR EXTENDED
CLEAN
$N_2\sqrt{288/T_a}$ - PERCENT RPM
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
CONFIGURATION
40,000
333,360
1,800,000
2 TIP GEAR EXTENDED
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER

FIGURE NO. 107
% $N_2 \times \sqrt{288/T_a}$ vs MACH
B-52A, USAF NO. 52-003
SEVEN ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.



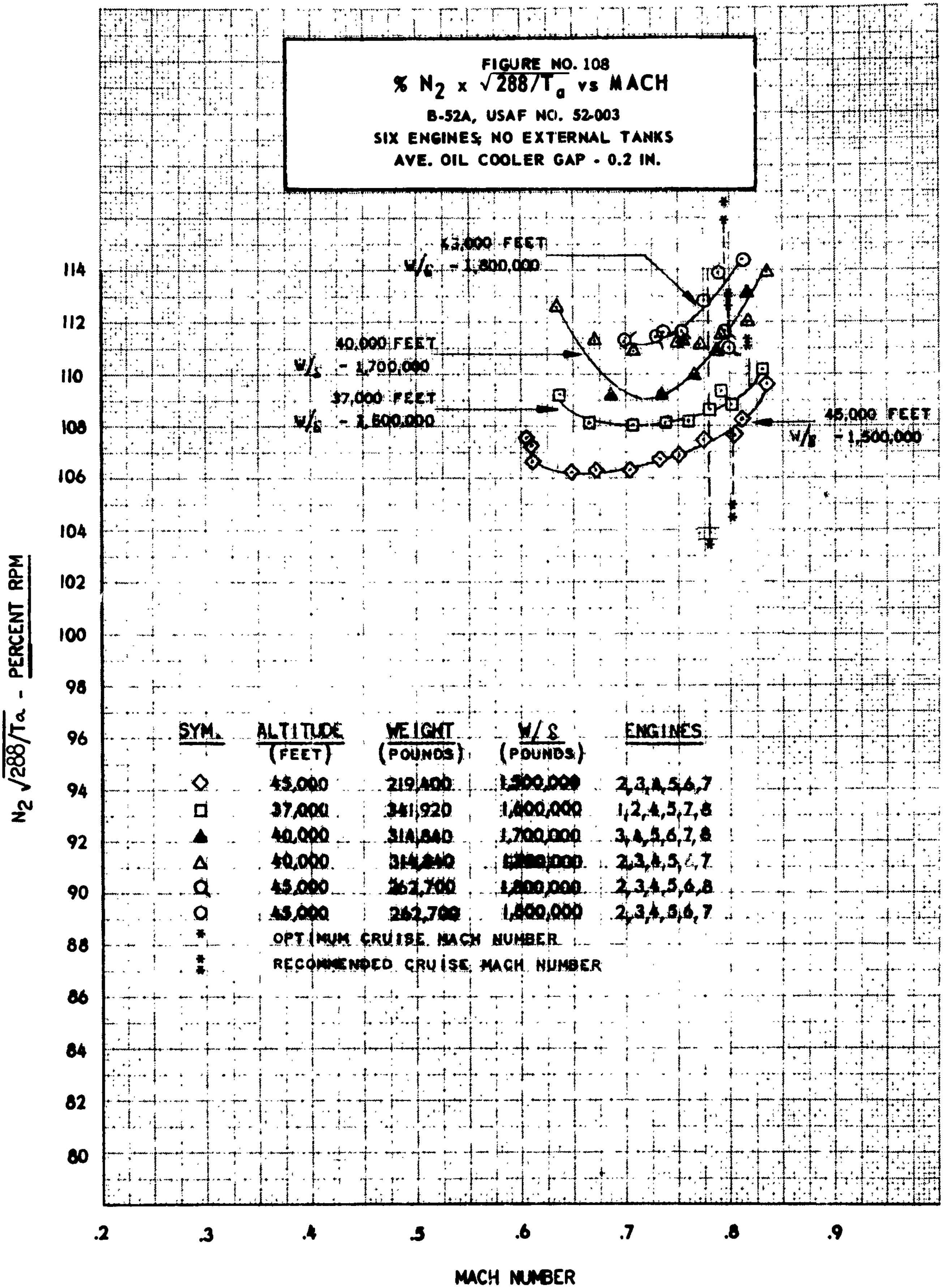


FIGURE NO. 108
% $N_2 \times \sqrt{288/T_a}$ vs MACH
B-52A, USAF NO. 52-003
SIX ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
45,000 FEET
W/δ - 1,800,000
40,000 FEET
W/δ - 1,700,000
37,000 FEET
W/δ - 1,600,000
45,000 FEET
W/δ - 1,500,000
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
ENGINES
45,000 219,400 1,500,000 2,3,4,5,6,7
37,000 341,920 1,600,000 1,2,4,5,7,8
40,000 314,840 1,700,000 3,4,5,6,7,8
40,000 314,840 1,700,000 2,3,4,5,6,7
45,000 262,700 1,800,000 2,3,4,5,6,8
45,000 262,700 1,800,000 2,3,4,5,6,7
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
$N_2\sqrt{288/T_a}$ - PERCENT RPM
MACH NUMBER

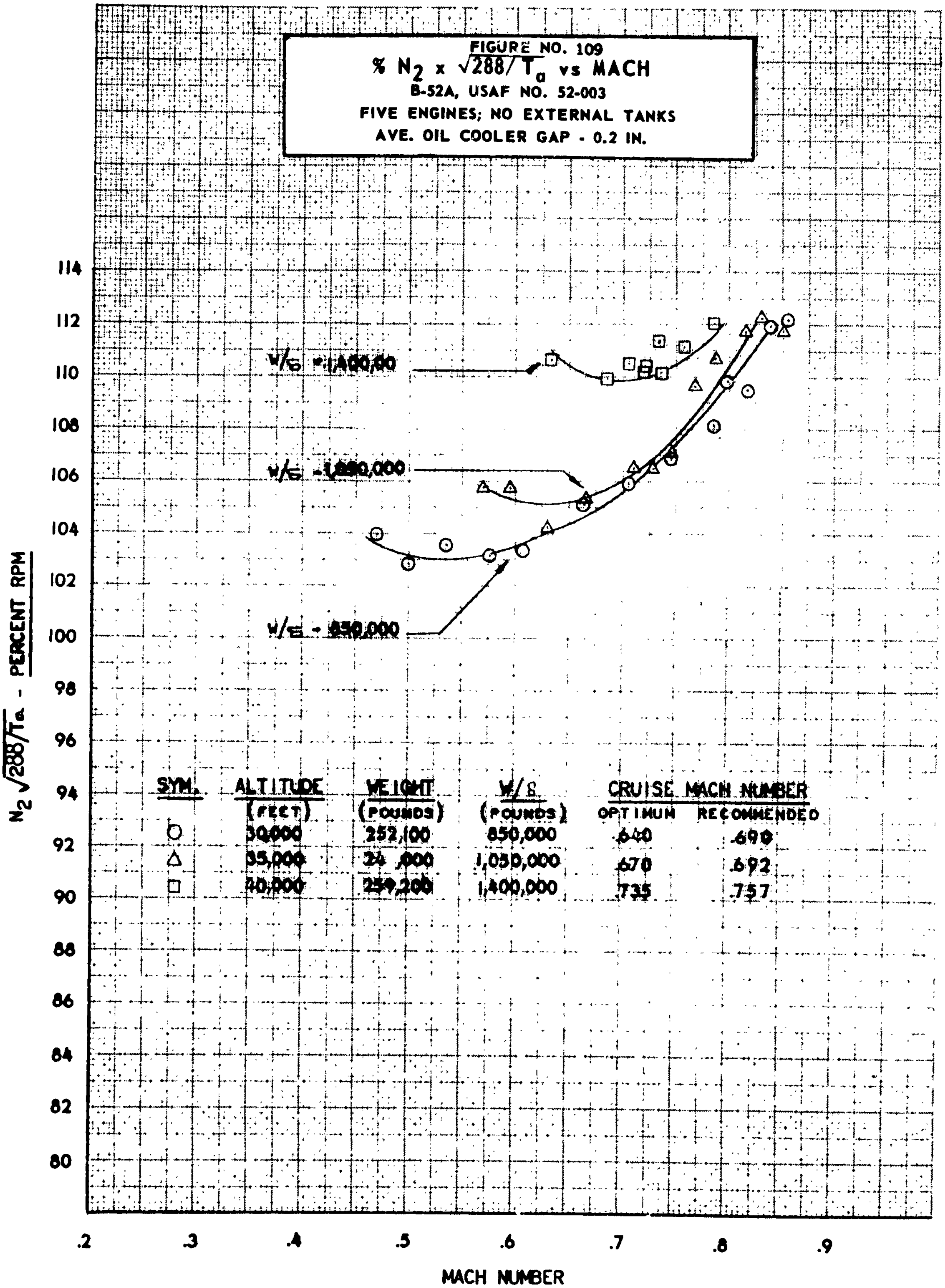


FIGURE NO. 109
% $N_2 \times \sqrt{288/T_a}$ vs MACH
B-52A, USAF NO. 52-003
FIVE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
W/δ = 1,400,000
W/δ = 1,050,000
W/δ = 850,000
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
CRUISE MACH NUMBER
OPTIMUM
RECOMMENDED
30,000 252,100 850,000 .640 .690
35,000 24 ,000 1,050,000 .670 .692
40,000 259,200 1,400,000 .735 .757
$N_2\sqrt{288/T_a}$ - PERCENT RPM
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

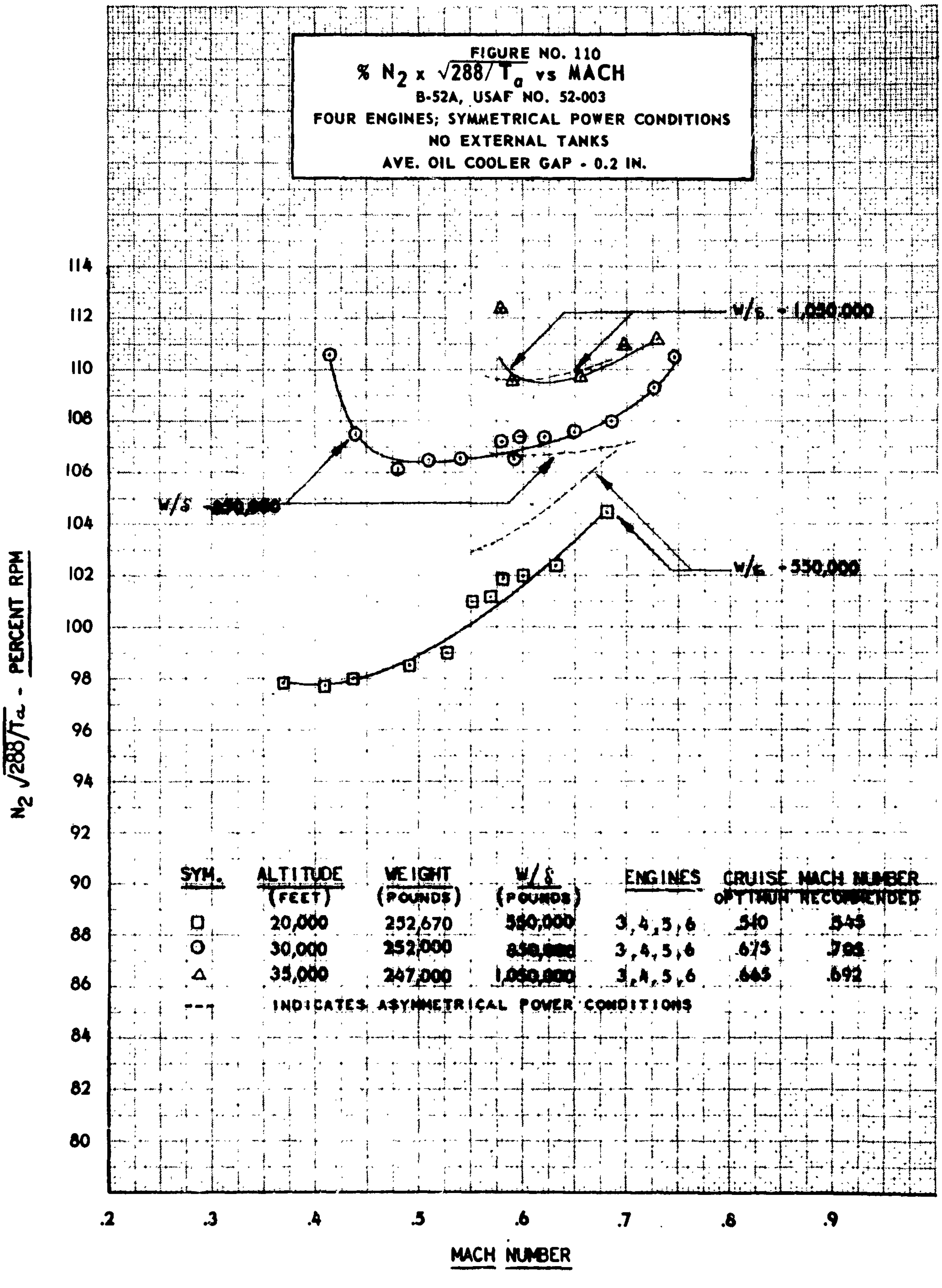


FIGURE NO. 110
% N_2 x $\sqrt{288/T_a}$ vs MACH
B-52A, USAF NO. 52-003
FOUR ENGINES; SYMMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
W/δ = 1,050,000
W/δ = 550,000
$N_2 \sqrt{288/T_a}$ - PERCENT RPM
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
ENGINES
CRUISE MACH NUMBER
OPTIMUM
RECOMMENDED
20,000
252,670
3,4,5,6
.540
30,000
252,000
3,4,5,6
.675
35,000
247,000
3,4,5,6
.692
INDICATES ASYMMETRICAL POWER CONDITIONS
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

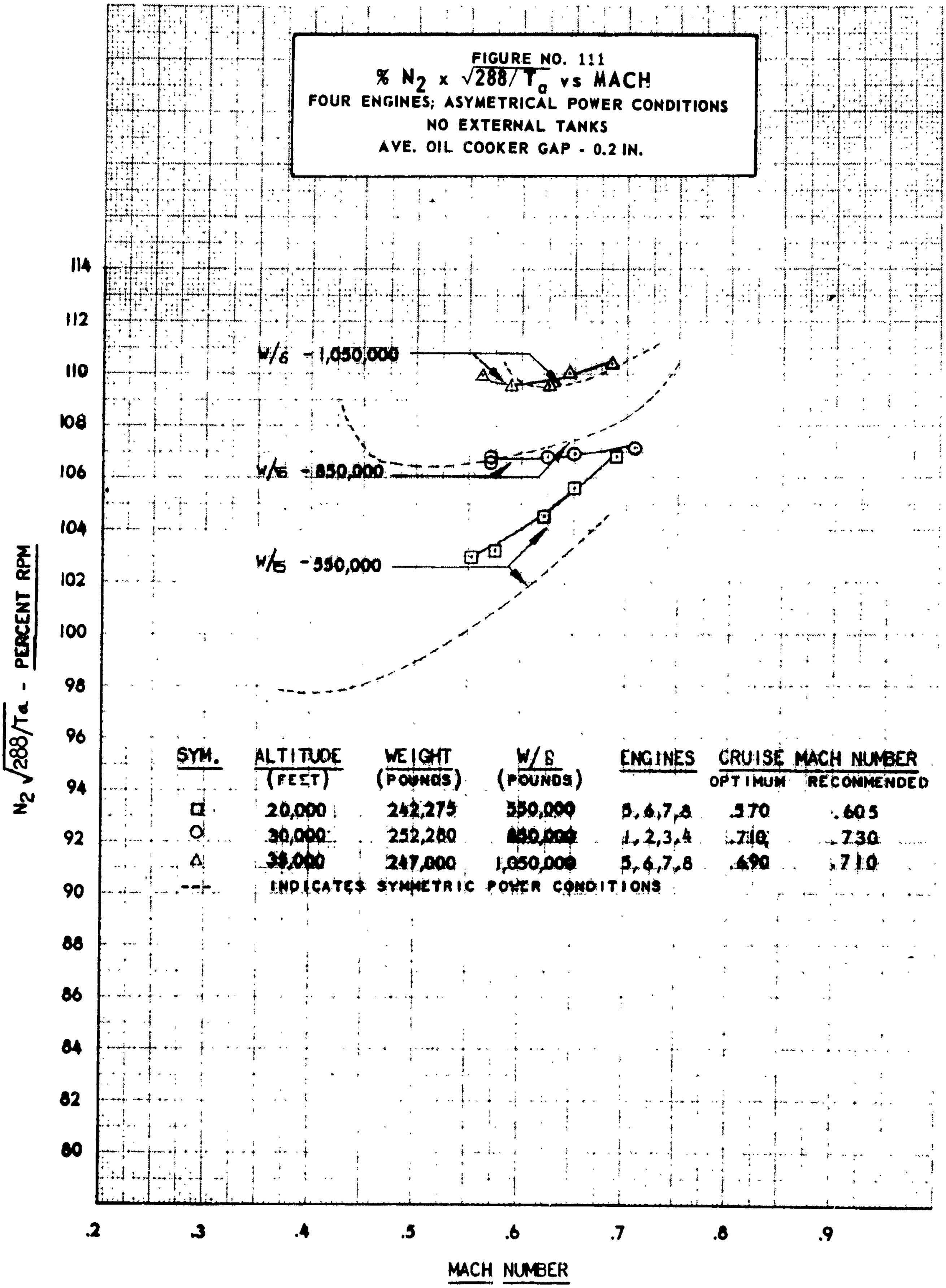


FIGURE NO. 111
% $N_2 \times \sqrt{288/T_a}$ vs MACH
FOUR ENGINES; ASYMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOKER GAP - 0.2 IN.

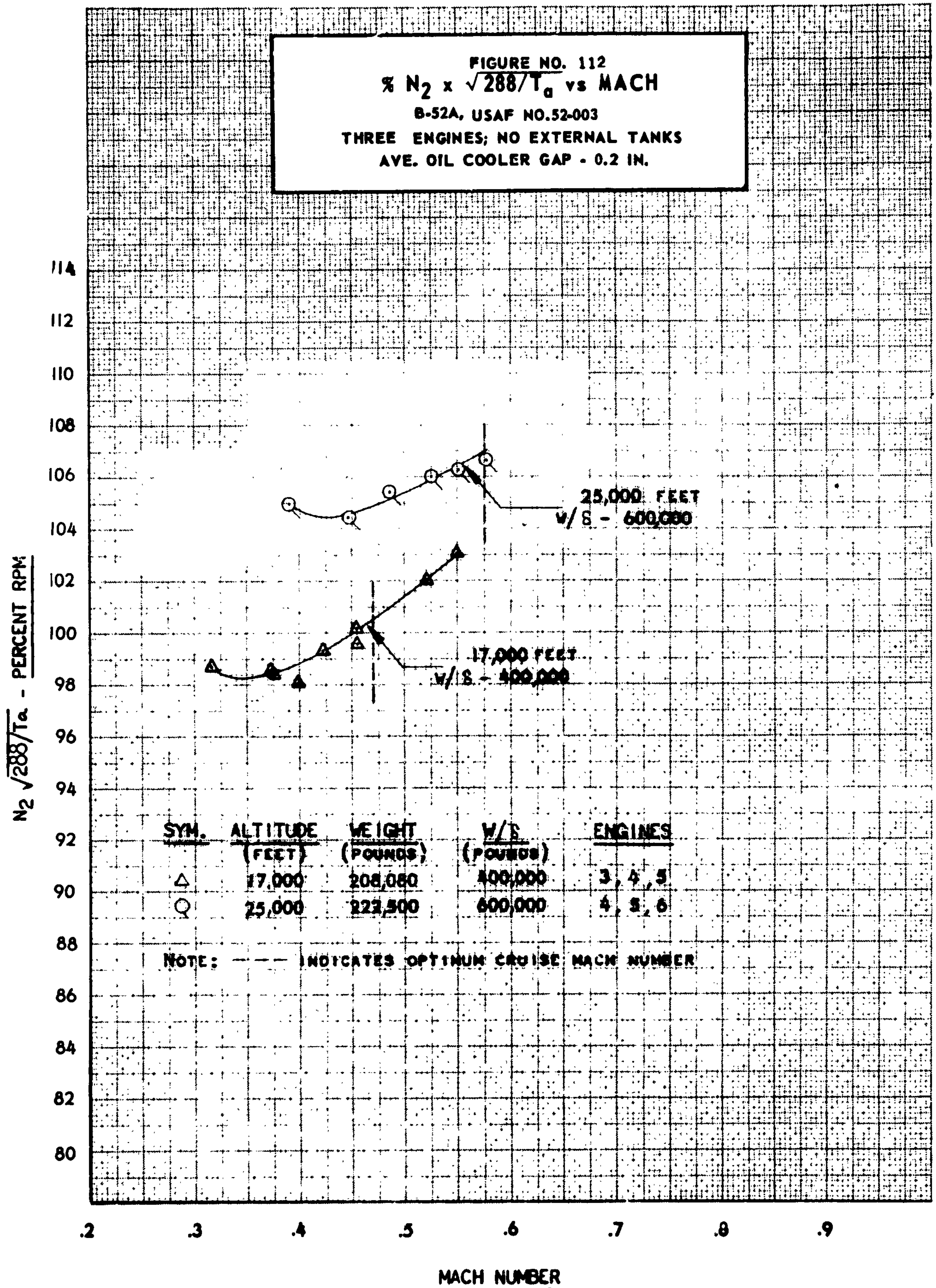


FIGURE NO. 112
% $N_2 \times \sqrt{288/T_a}$ vs MACH
B-52A, USAF NO.52-003
THREE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
25,000 FEET
W/δ - 600,000
17,000 FEET
W/δ - 400,000
SYM. | ALTITUDE (FEET) | WEIGHT (POUNDS) | W/δ (POUNDS) | ENGINES
△ | 17,000 | 208,080 | 400,000 | 3, 4, 5
⊙ | 25,000 | 222,500 | 600,000 | 4, 5, 6
NOTE: ― ― ― INDICATES OPTIMUM CRUISE MACH NUMBER
$N_2 \sqrt{288/T_a}$ - PERCENT RPM
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

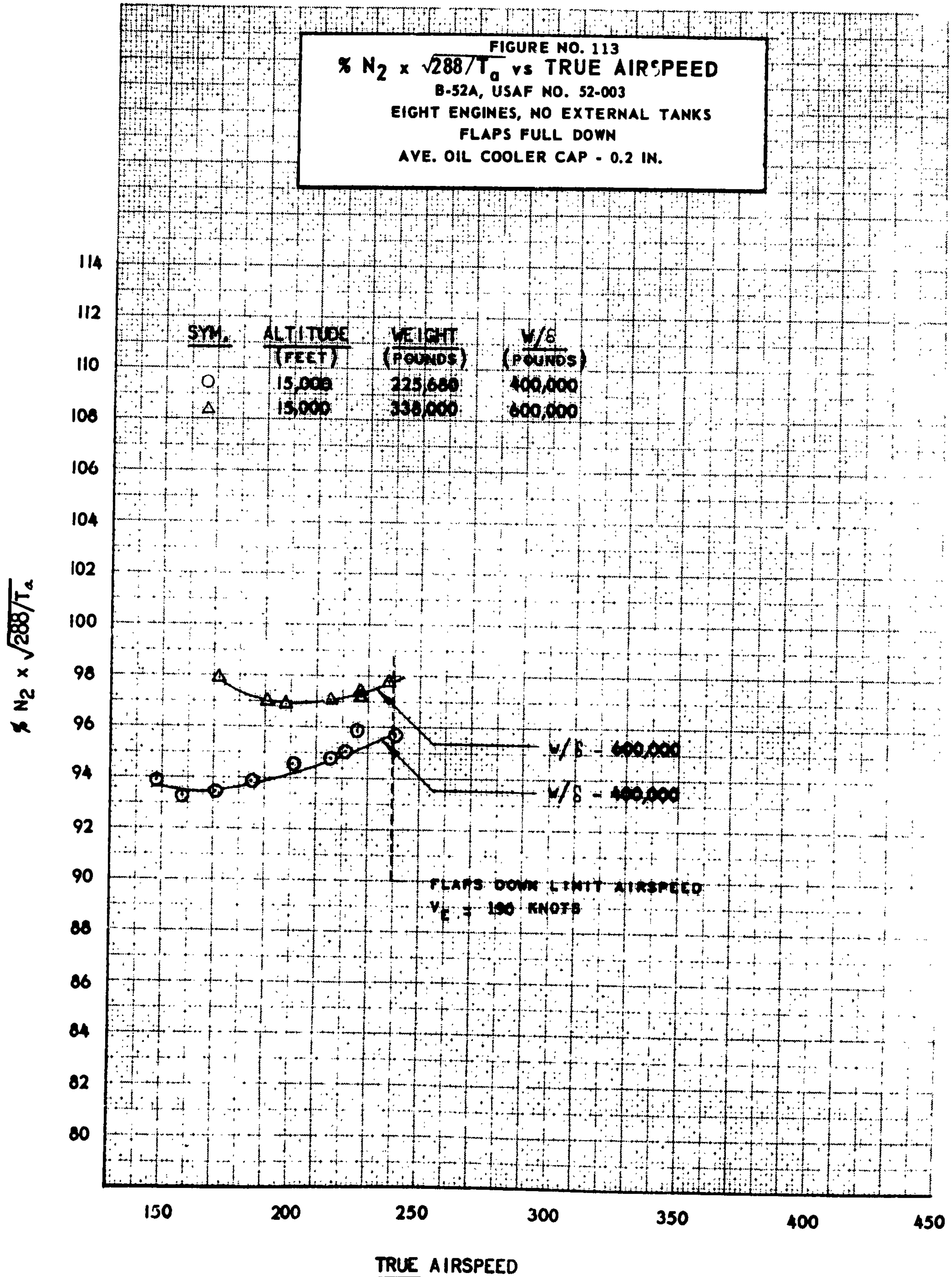


FIGURE NO. 113
% $N_2 \times \sqrt{288/T_a}$ vs TRUE AIRSPEED
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS FULL DOWN
AVE. OIL COOLER CAP - 0.2 IN.
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
○ 15,000 225,680 400,000
△ 15,000 338,000 600,000
W/δ - 600,000
W/δ - 400,000
FLAPS DOWN LIMIT AIRSPEED
V_E = 190 KNOTS
% $N_2 \times \sqrt{288/T_a}$
TRUE AIRSPEED
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
150
200
250
300
350
400
450

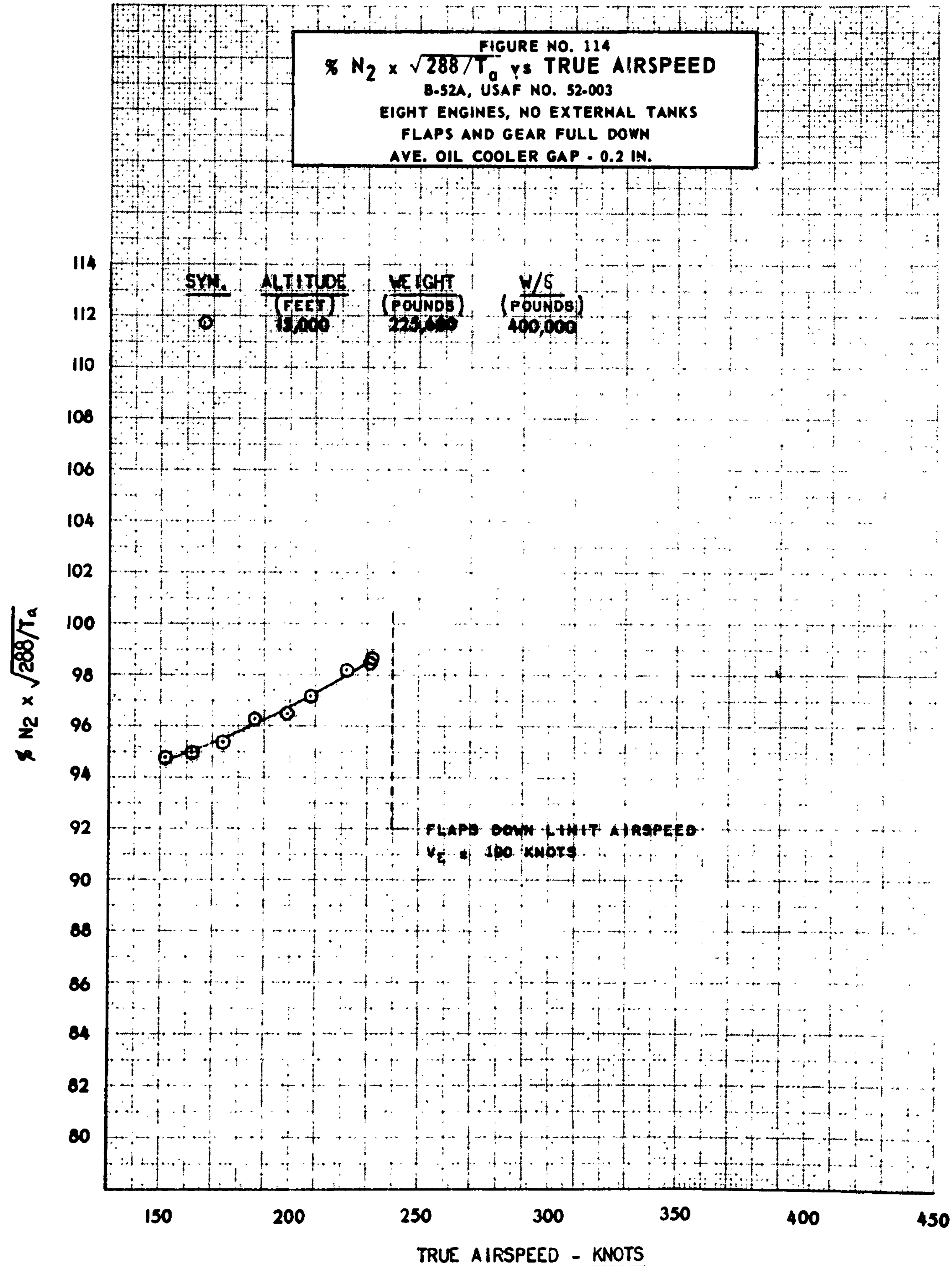


FIGURE NO. 114
% $N_2 \times \sqrt{288/T_a}$ vs TRUE AIRSPEED
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS AND GEAR FULL DOWN
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
15,000
WEIGHT (POUNDS)
W/δ (POUNDS)
400,000
FLAPS DOWN LIMIT AIRSPEED
V_E = 180 KNOTS
% $N_2 \times \sqrt{288/T_a}$
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
150
200
250
300
350
400
450
TRUE AIRSPEED - KNOTS

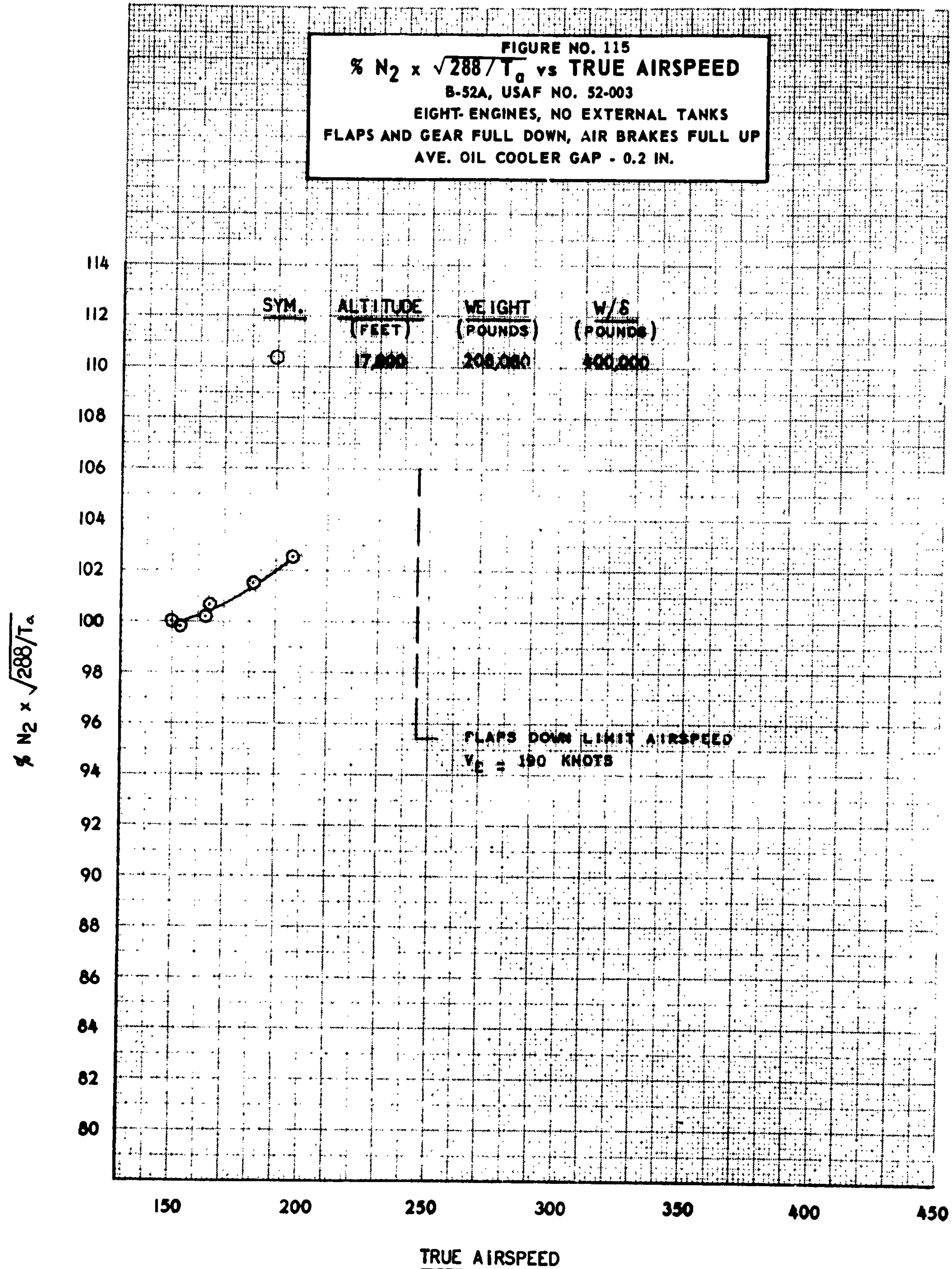


FIGURE NO. 115
% N_2 x $\sqrt{288/T_a}$ vs TRUE AIRSPEED
B-52A, USAF NO. 52-003
EIGHT- ENGINES, NO EXTERNAL TANKS
FLAPS AND GEAR FULL DOWN, AIR BRAKES FULL UP
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
17,000
200,000
400,000
FLAPS DOWN LIMIT AIRSPEED
V_c = 190 KNOTS
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
% N_2 x $\sqrt{288/T_a}$
150
200
250
300
350
400
450
TRUE AIRSPEED

FIGURE NO. 116

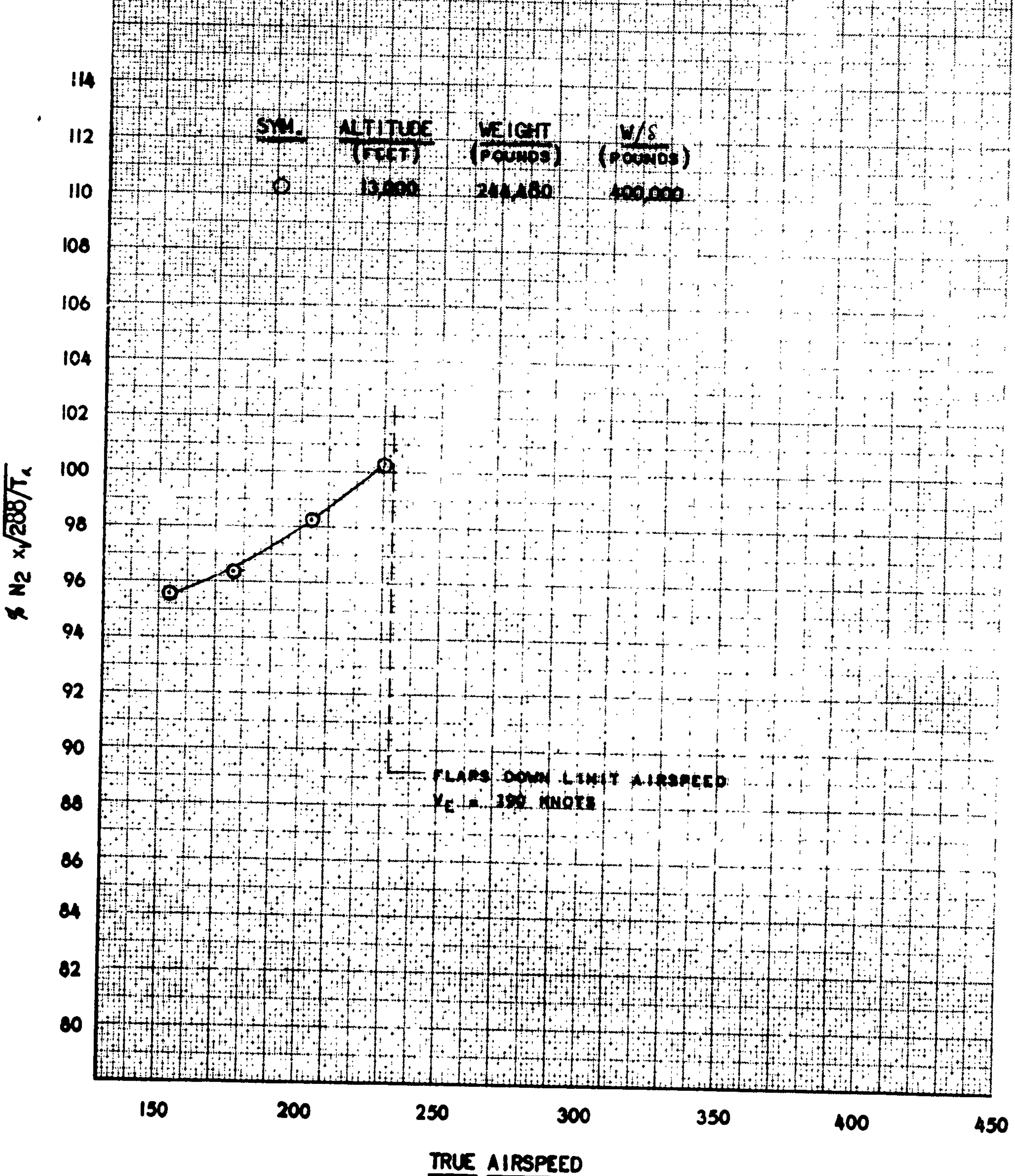
% $N_2 \times \sqrt{288/T_a}$ vs TRUE AIRSPEED

B-52A, USAF NO. 52-003

EIGHT ENGINES, NO EXTERNAL TANKS

FLAPS AND GEAR FULL DOWN, AIR BRAKES POSITION NO. 2 (33.3% UP)

AVE. OIL COOLER GAP - 0.2 IN.



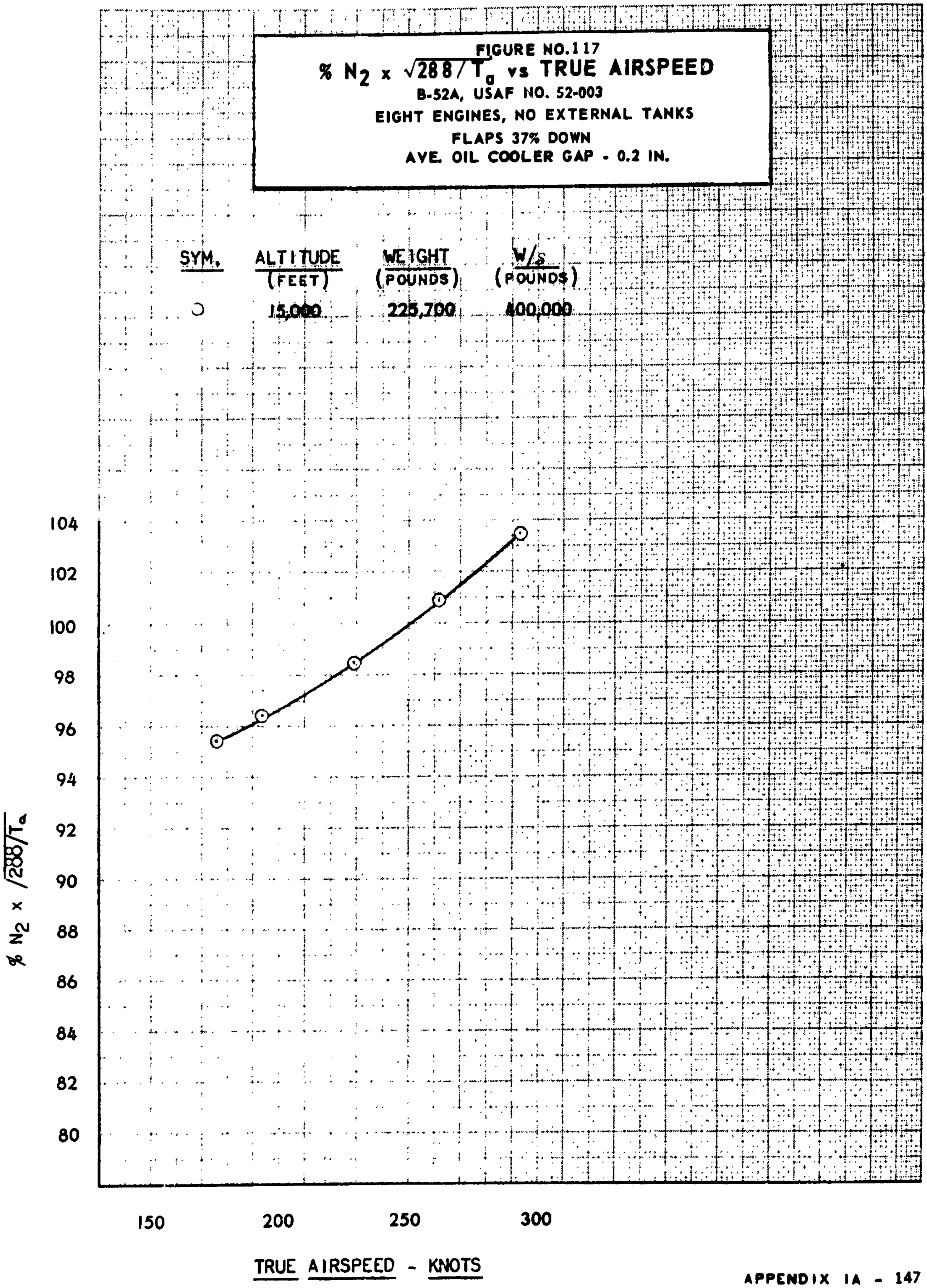


FIGURE NO. 117
% $N_2 \times \sqrt{288/T_a}$ vs TRUE AIRSPEED
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS 37% DOWN
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/S (POUNDS)
15,000
225,700
400,000
104
102
100
98
96
94
92
90
88
86
84
82
80
% $N_2 \times \sqrt{288/T_a}$
150
200
250
300
TRUE AIRSPEED - KNOTS

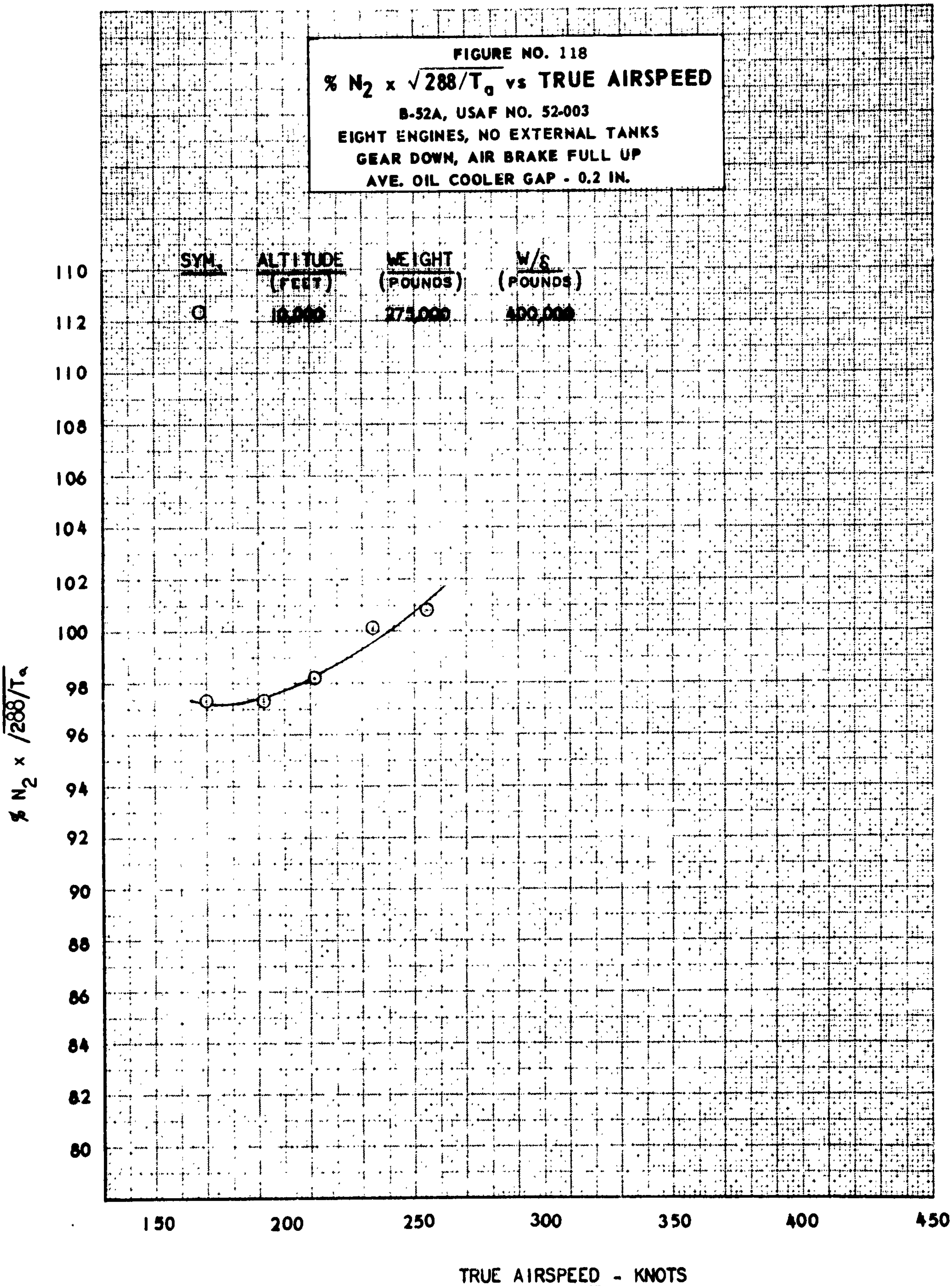


FIGURE NO. 118
% N2 x √288/Ta vs TRUE AIRSPEED
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
GEAR DOWN, AIR BRAKE FULL UP
AVE. OIL COOLER GAP - 0.2 IN.
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
10,000 275,000 400,000
110
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
% N2 x √288/Ta
150
200
250
300
350
400
450
TRUE AIRSPEED - KNOTS

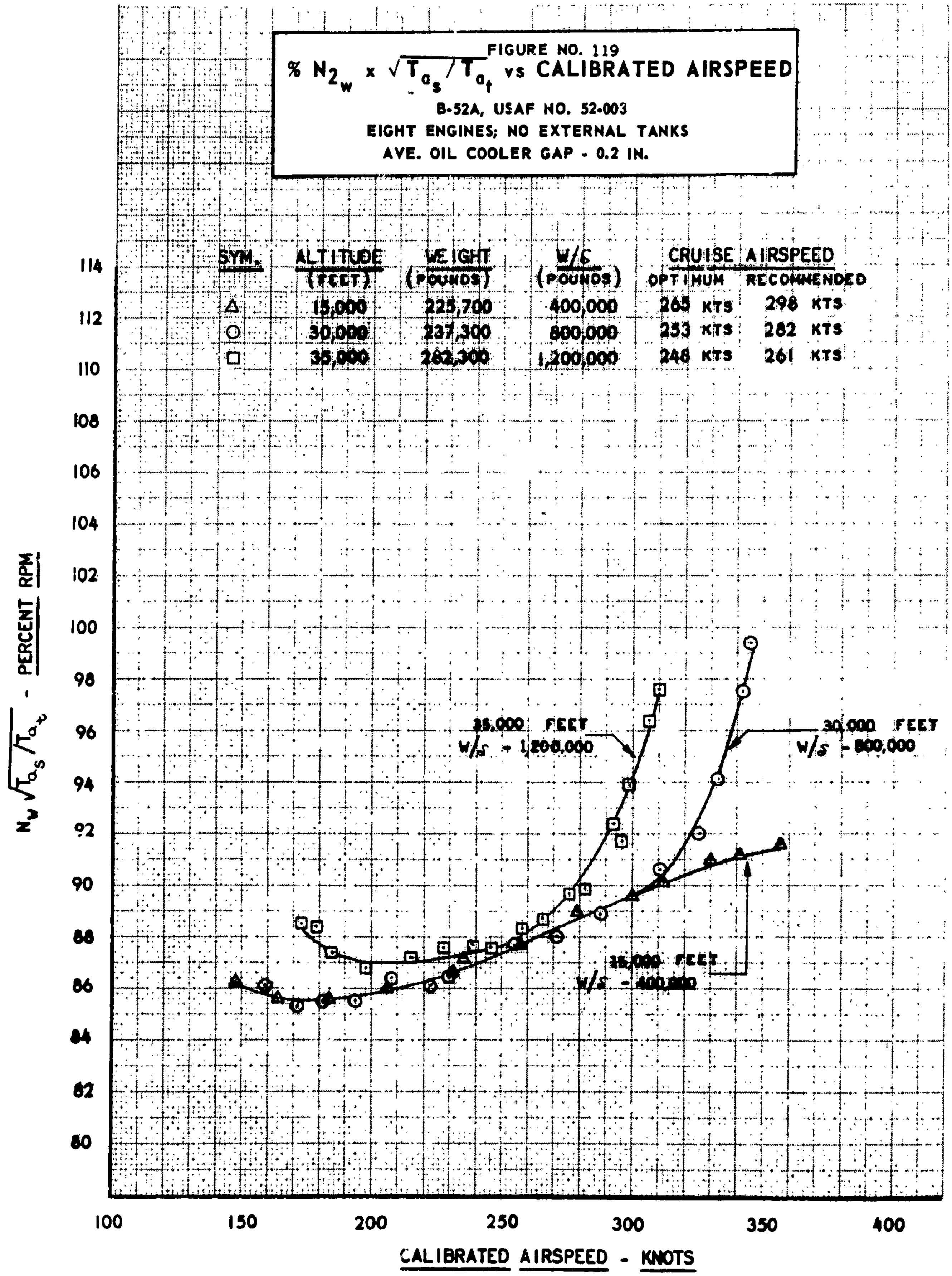
FIGURE NO. 119

% $N_{2_w} \times \sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED

B-52A, USAF NO. 52-003

EIGHT ENGINES; NO EXTERNAL TANKS

AVE. OIL COOLER GAP - 0.2 IN.



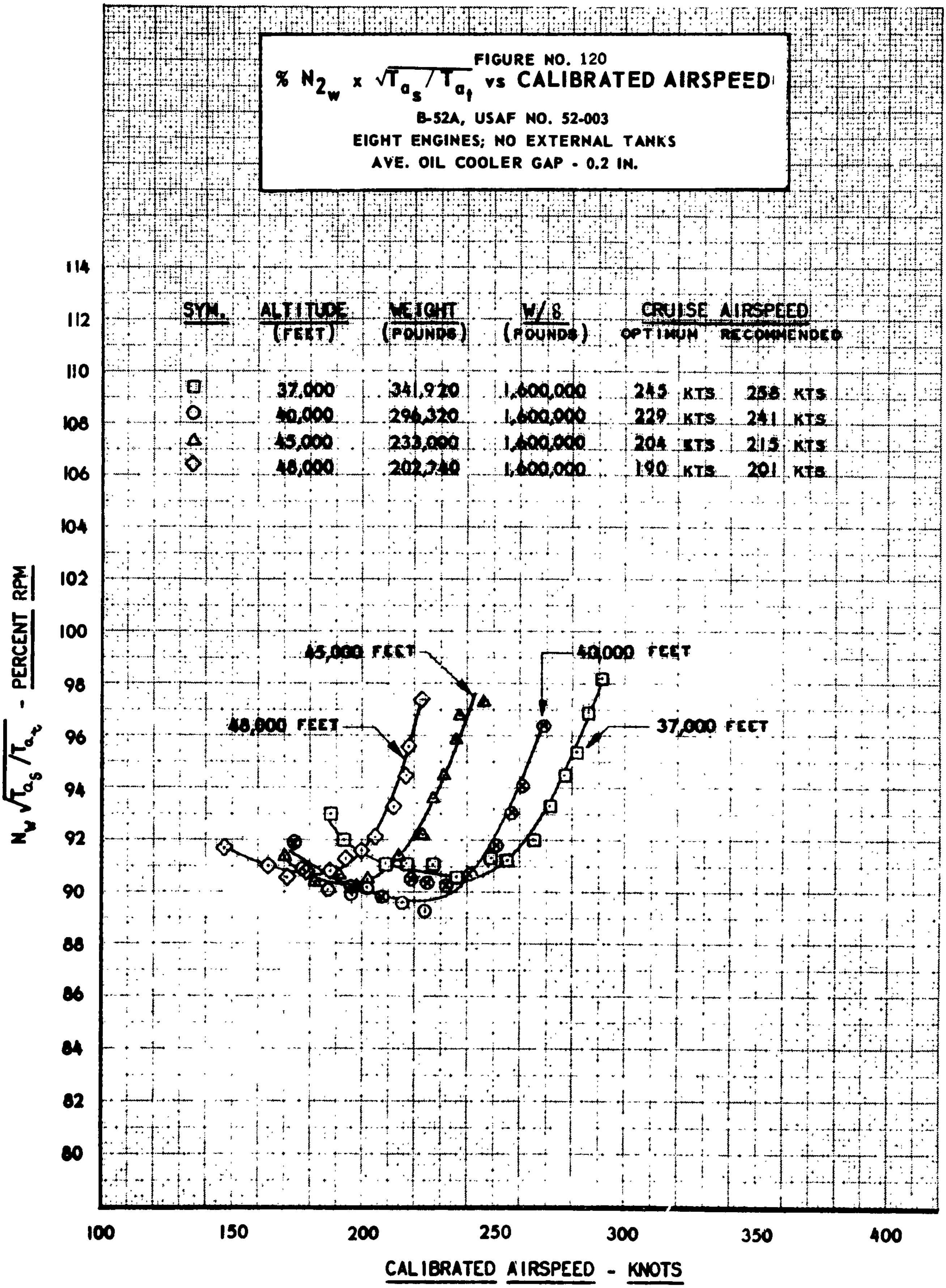


FIGURE NO. 120
% N_{2_w} x $\sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM. | ALTITUDE (FEET) | WEIGHT (POUNDS) | W/δ (POUNDS) | CRUISE AIRSPEED OPTIMUM | RECOMMENDED
□ | 37,000 | 341,920 | 1,600,000 | 245 KTS | 258 KTS
○ | 40,000 | 296,320 | 1,600,000 | 229 KTS | 241 KTS
△ | 45,000 | 233,000 | 1,600,000 | 204 KTS | 215 KTS
◇ | 48,000 | 202,740 | 1,600,000 | 190 KTS | 201 KTS
45,000 FEET
40,000 FEET
48,000 FEET
37,000 FEET
$N_w\sqrt{T_{a_s}/T_{a_t}}$ - PERCENT RPM
CALIBRATED AIRSPEED - KNOTS
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
100
150
200
250
300
350
400

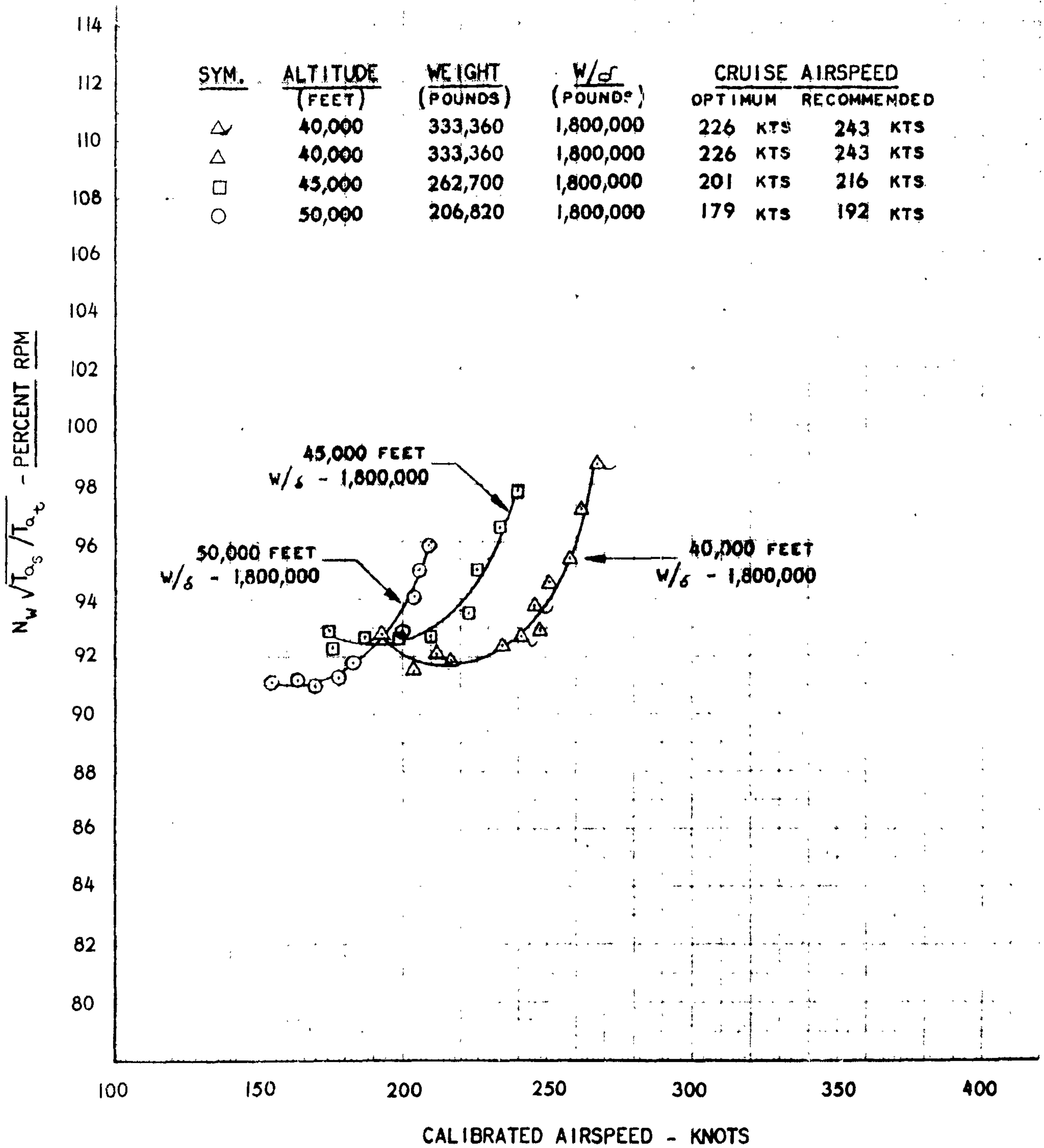
FIGURE NO. 121

% $N_{2_w} \times \sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED

B-52A, USAF NO. 52-003

EIGHT ENGINES; NO EXTERNAL TANKS

AVE. OIL COOLER GAP - 0.2 IN.



SYM.	ALTITUDE (FEET)	WEIGHT (POUNDS)	W/δ (POUNDS)	CRUISE AIRSPEED OPTIMUM	CRUISE AIRSPEED RECOMMENDED
△ (flagged)	40,000	333,360	1,800,000	226 KTS	243 KTS
△	40,000	333,360	1,800,000	226 KTS	243 KTS
□	45,000	262,700	1,800,000	201 KTS	216 KTS
○	50,000	206,820	1,800,000	179 KTS	192 KTS

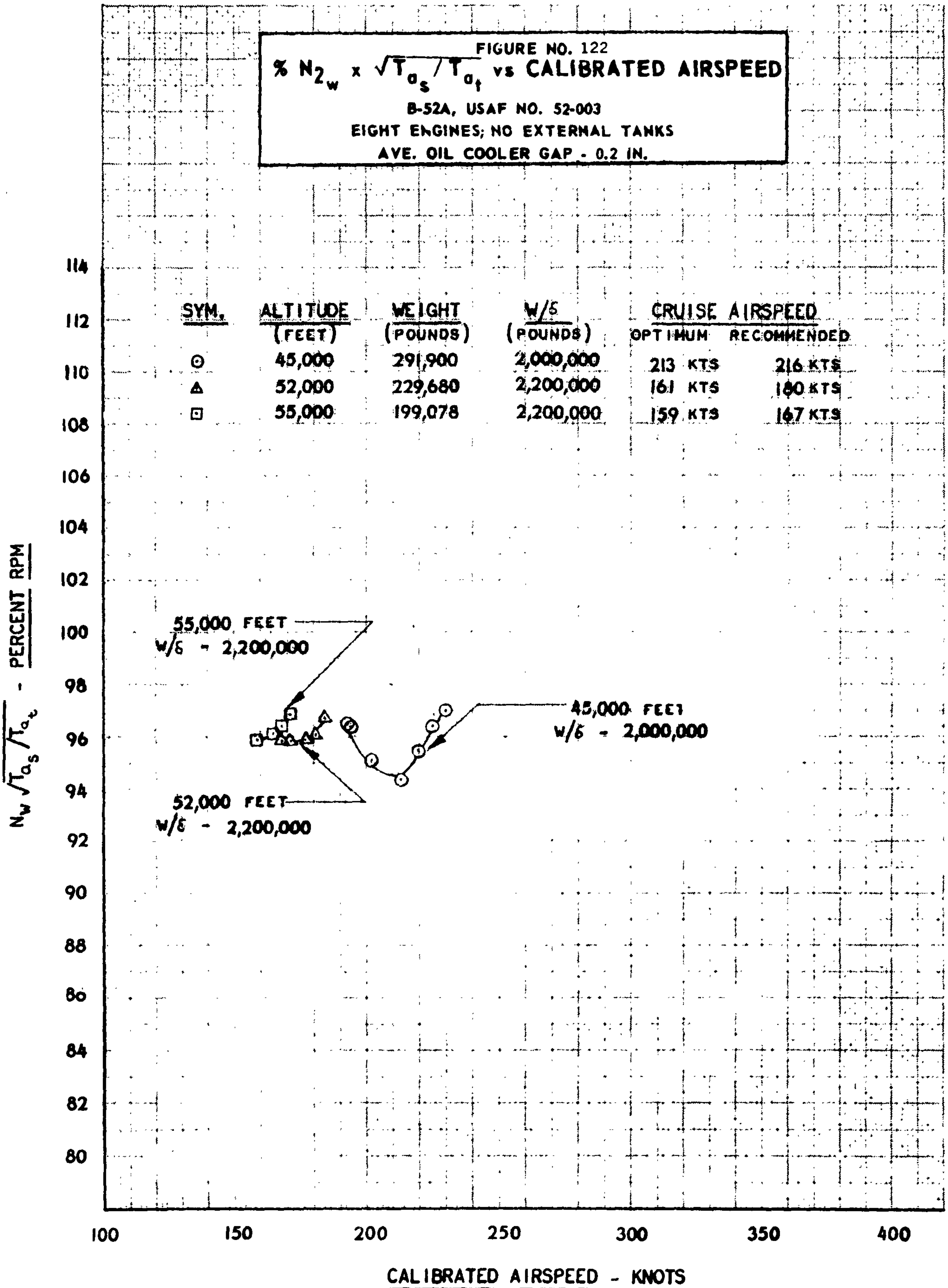


FIGURE NO. 122
% $N_{2_w} \times \sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
CRUISE AIRSPEED
OPTIMUM
RECOMMENDED
45,000
291,900
2,000,000
213 KTS
216 KTS
52,000
229,680
2,200,000
161 KTS
180 KTS
55,000
199,078
2,200,000
159 KTS
167 KTS
55,000 FEET
W/δ - 2,200,000
45,000 FEET
W/δ - 2,000,000
52,000 FEET
W/δ - 2,200,000
$N_W \sqrt{T_{a_s}/T_{a_t}}$ - PERCENT RPM
CALIBRATED AIRSPEED - KNOTS
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
100
150
200
250
300
350
400

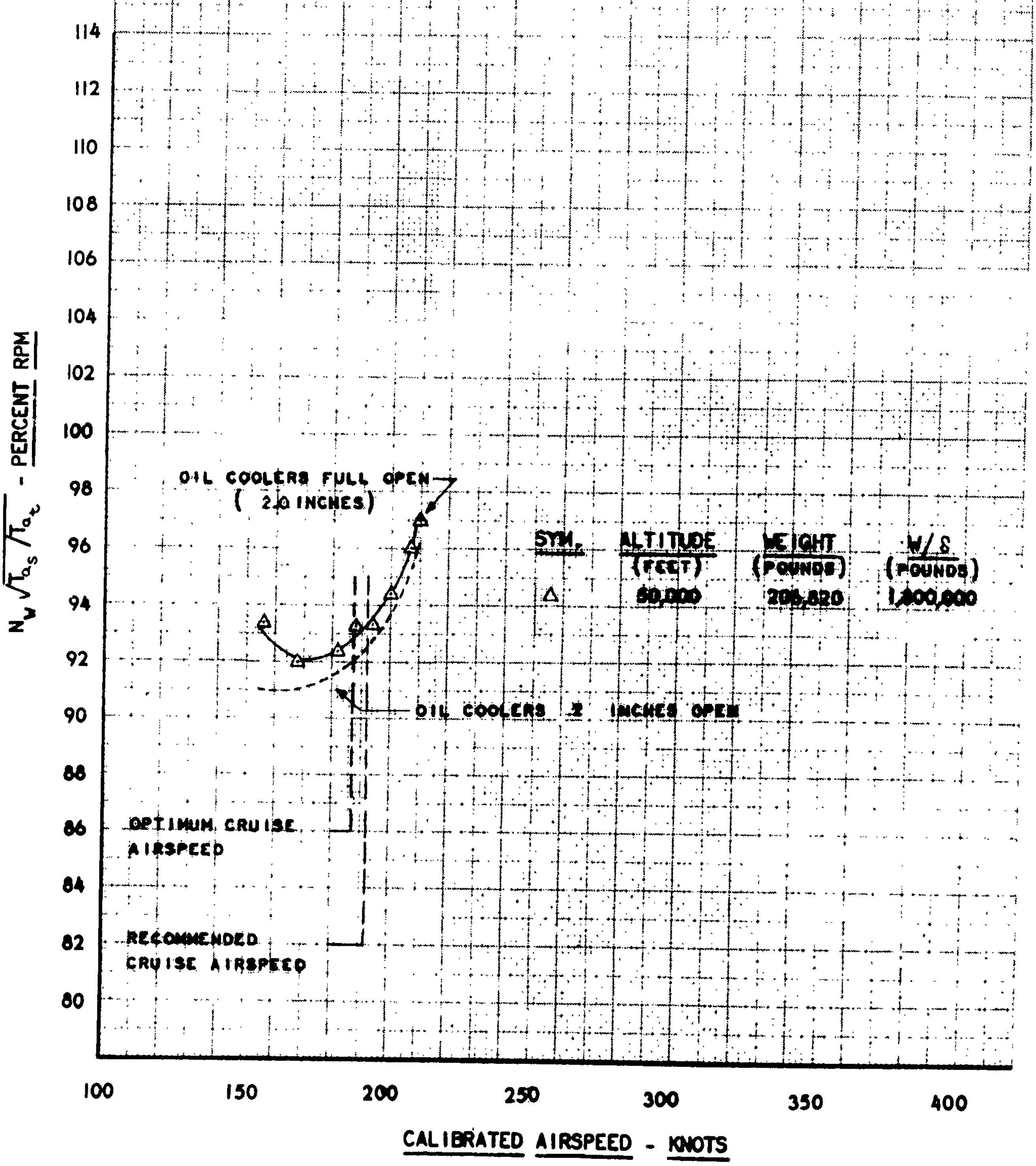
FIGURE NO. 123

% $N_{2_w} \times \sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED

B-52A, USAF NO. 52-003

EIGHT ENGINES; NO EXTERNAL TANKS

OIL COOLER GAP NOTED



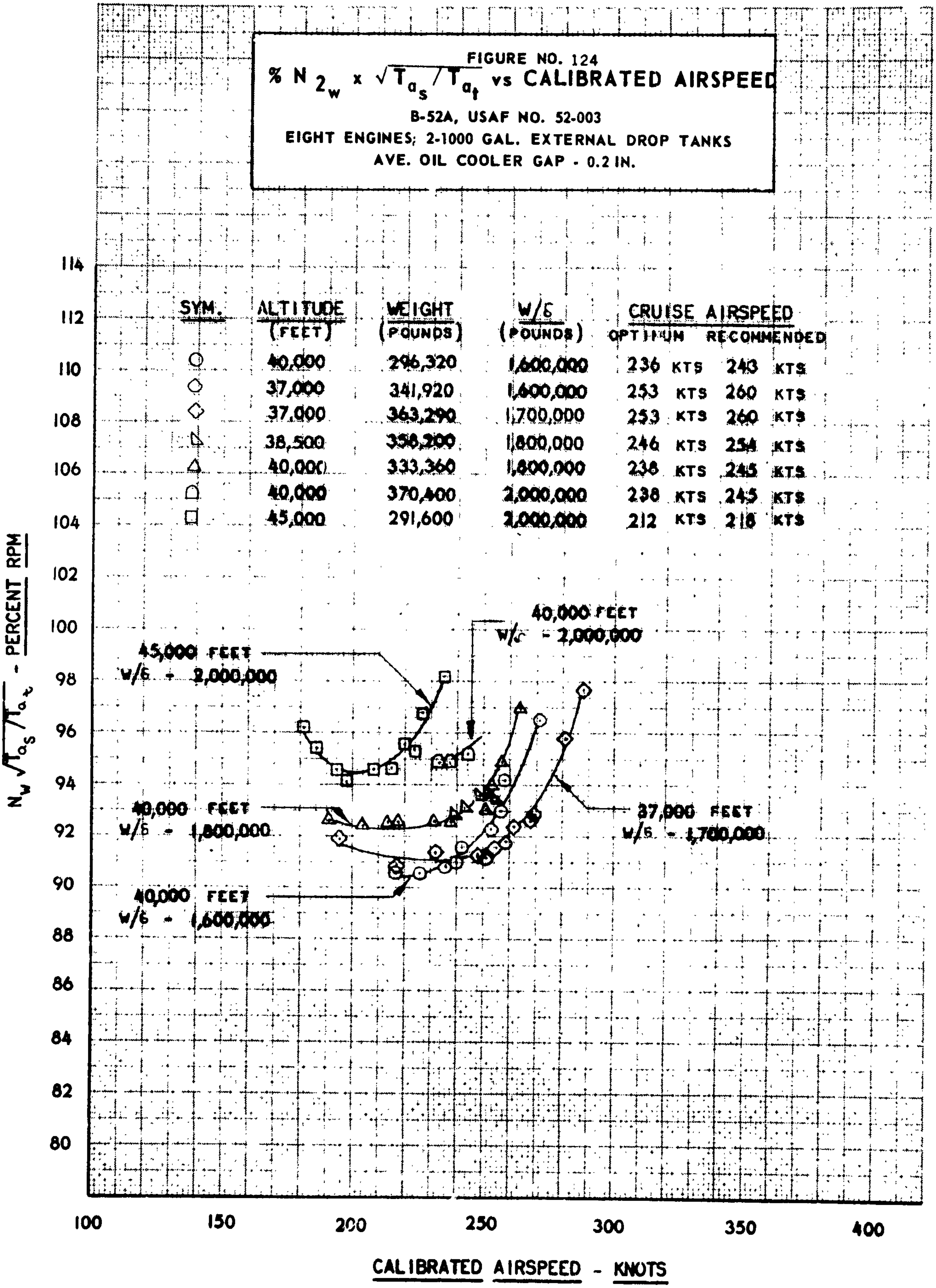


FIGURE NO. 124

$\% N_{2_w} \times \sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED

B-52A, USAF NO. 52-003

EIGHT ENGINES; 2-1000 GAL. EXTERNAL DROP TANKS

AVE. OIL COOLER GAP - 0.2 IN.

FIGURE NO. 125

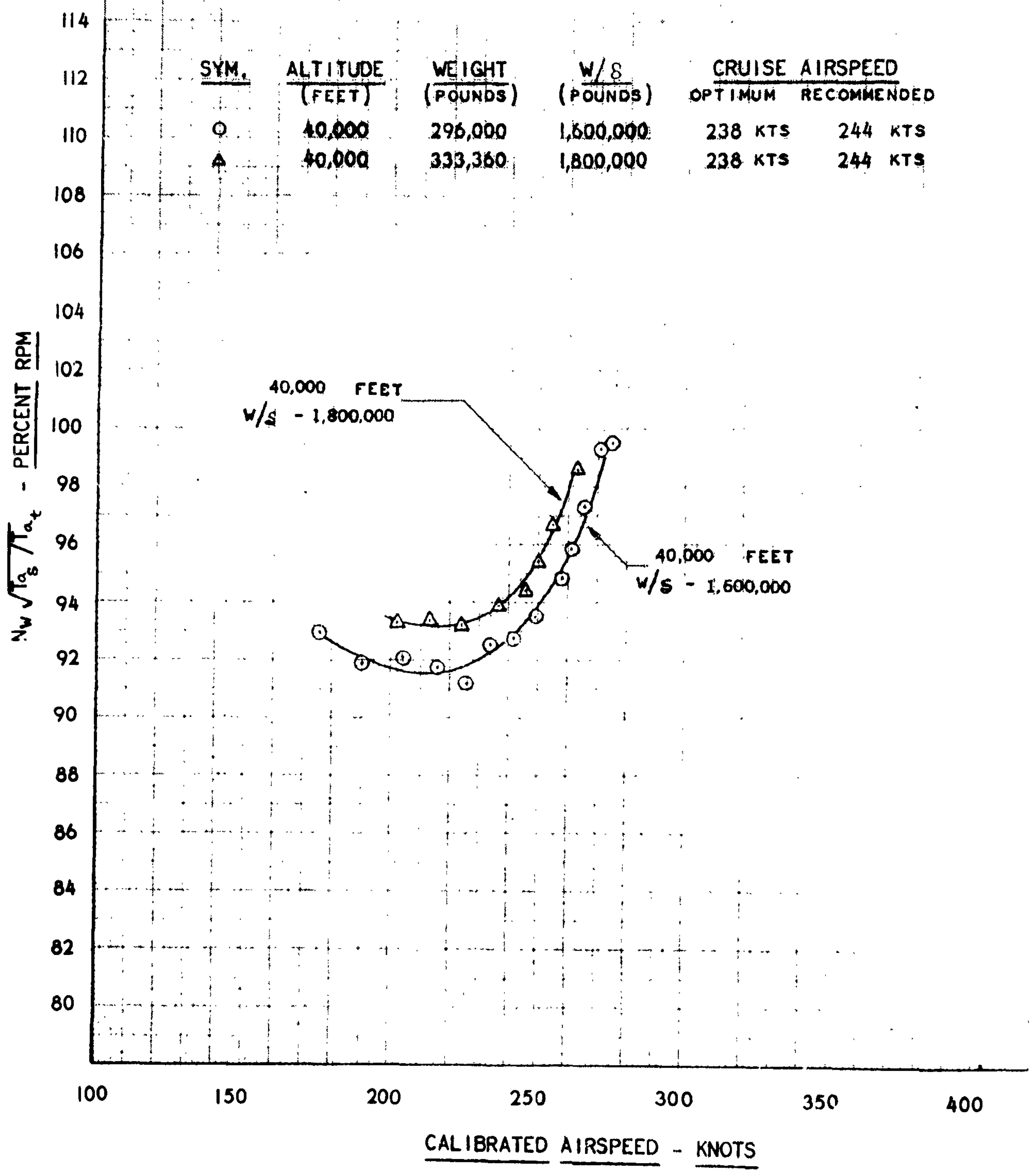
$\% \ N_{2_w} \times \sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED

B-52A, USAF NO. 52-003

EIGHT ENGINES; NO EXTERNAL TANKS

AVE. OIL COOLER GAP - 0.2 IN.

BOMB BAY DOORS OPEN



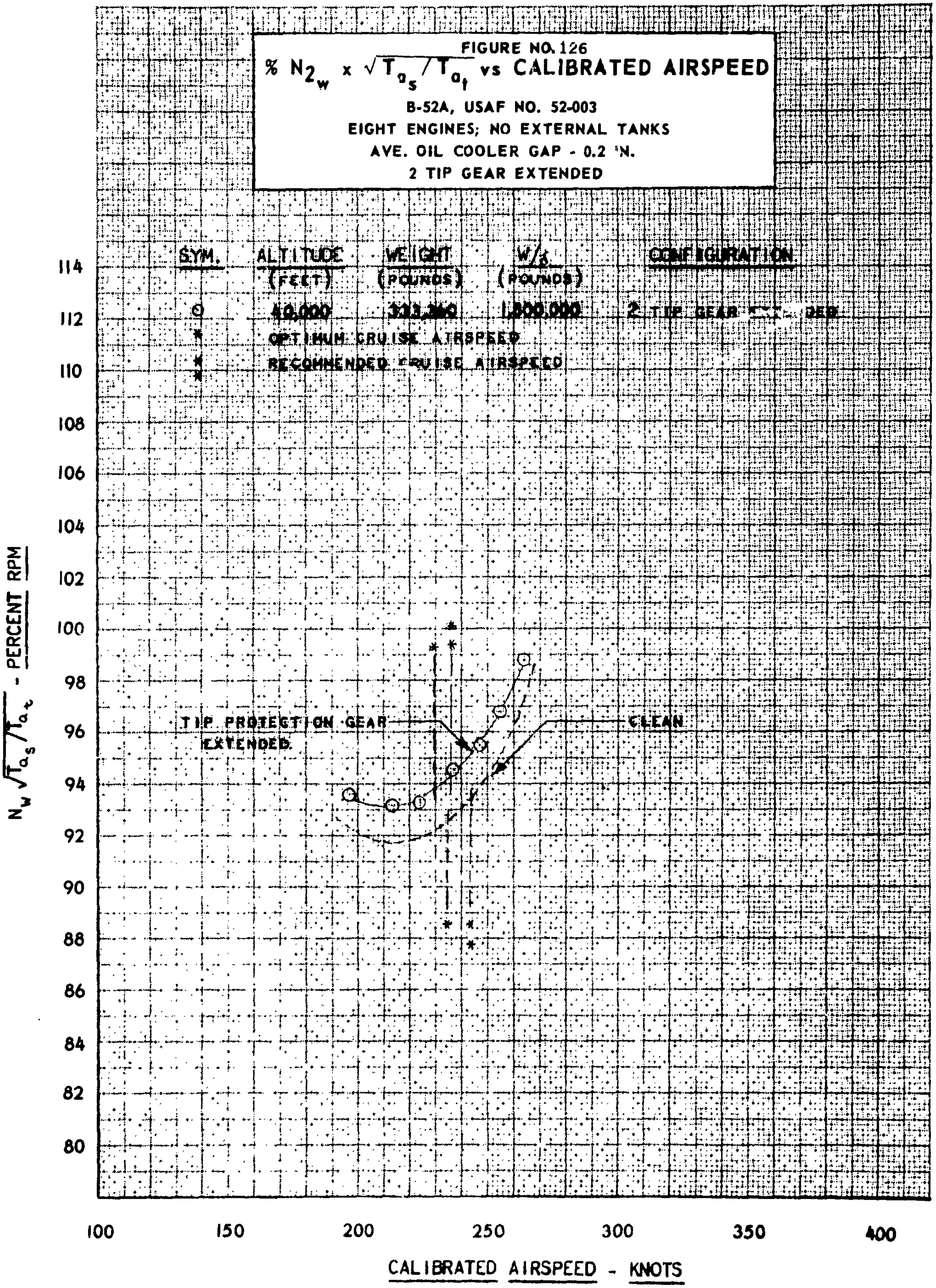


FIGURE NO. 126
% $N_{2_w} \times \sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
2 TIP GEAR EXTENDED
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
CONFIGURATION
40,000
1,300,000
OPTIMUM CRUISE AIRSPEED
RECOMMENDED CRUISE AIRSPEED
TIP PROTECTION GEAR EXTENDED
CLEAN
$N_w \sqrt{T_{a_s}/T_{a_t}}$ - PERCENT RPM
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
100
150
200
250
300
350
400
CALIBRATED AIRSPEED - KNOTS

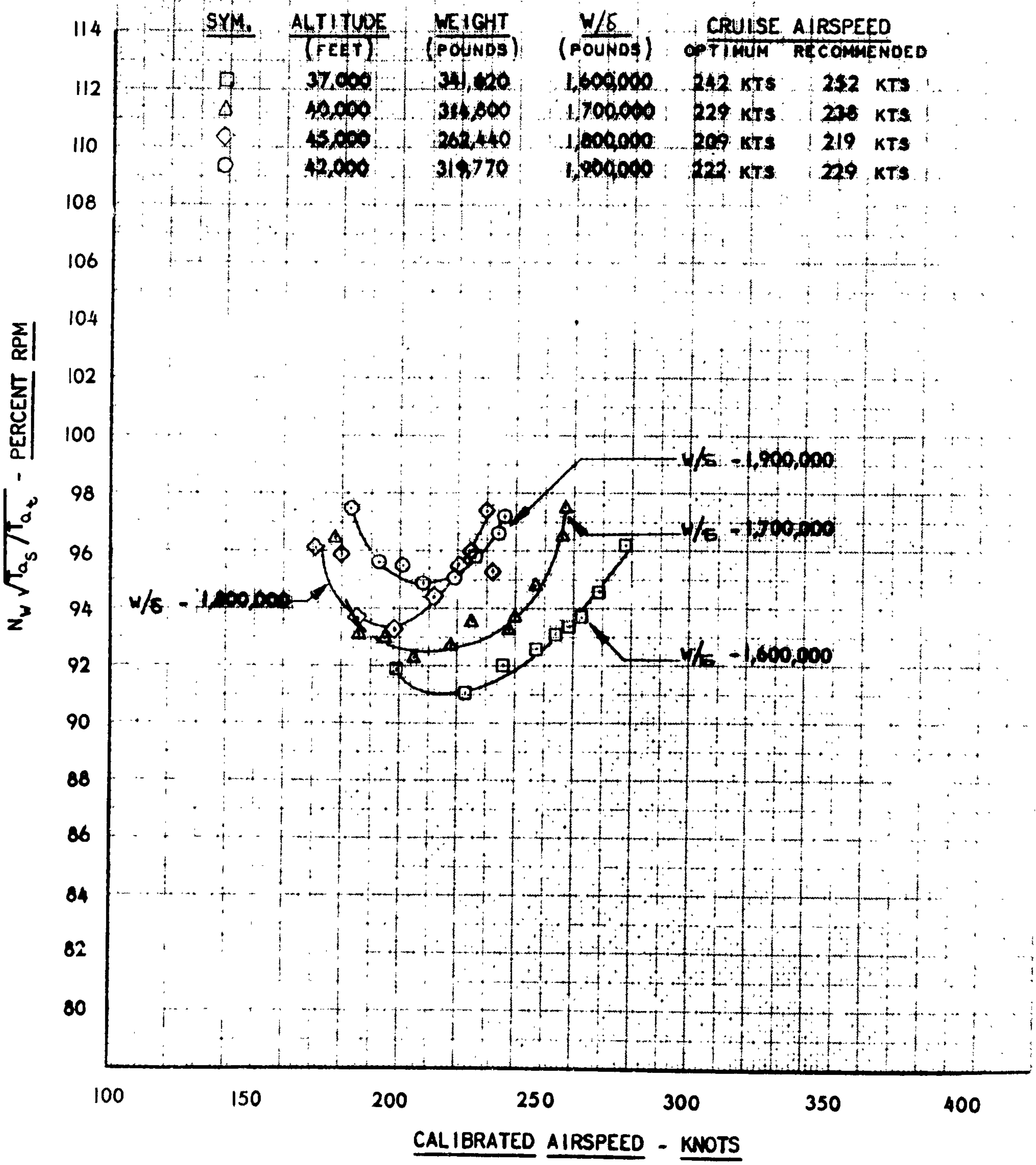
FIGURE NO. 127

% $N_{2_w} \times \sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED

B-52A, USAF NO. 52-003

SEVEN ENGINES; NO EXTERNAL TANKS

AVE. OIL COOLER GAP - 0.2 IN.



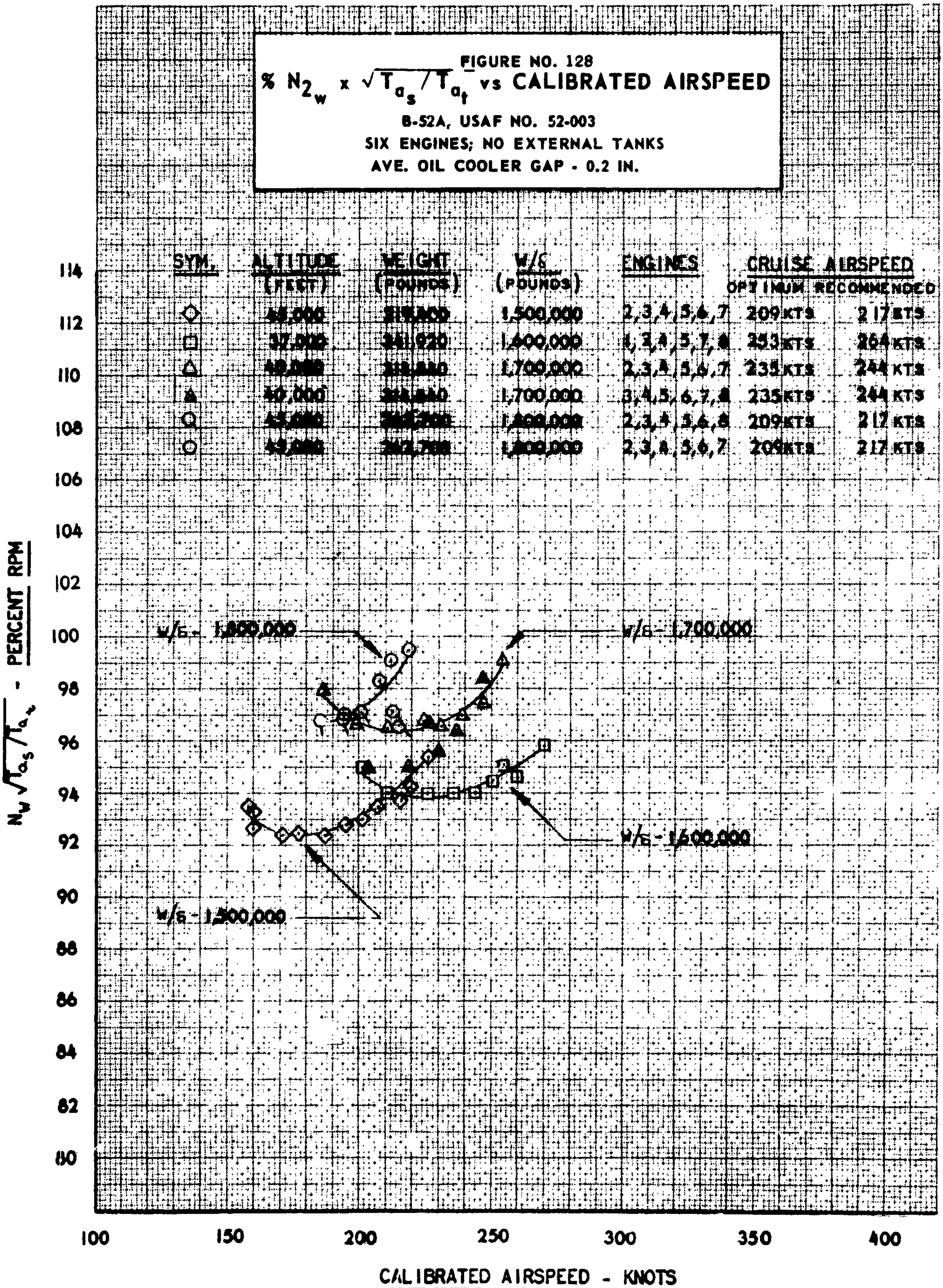


FIGURE NO. 128
% N_{2_w} x $\sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED
B-52A, USAF NO. 52-003
SIX ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
ENGINES
CRUISE AIRSPEED
OPTIMUM
RECOMMENDED
1,500,000 2,3,4,5,6,7 209 KTS 217 KTS
37,000 241,920 1,600,000 253 KTS 264 KTS
1,700,000 2,3,4,5,6,7 235 KTS 244 KTS
40,000 1,700,000 235 KTS 244 KTS
2,3,4,5,6,8 209 KTS 217 KTS
2,3,4,5,6,7 209 KTS 217 KTS
W/δ - 1,800,000
W/δ - 1,700,000
W/δ - 1,600,000
W/δ - 1,500,000
$N_W \sqrt{T_{a_s}/T_{a_t}}$ - PERCENT RPM
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
100
150
200
250
300
350
400
CALIBRATED AIRSPEED - KNOTS

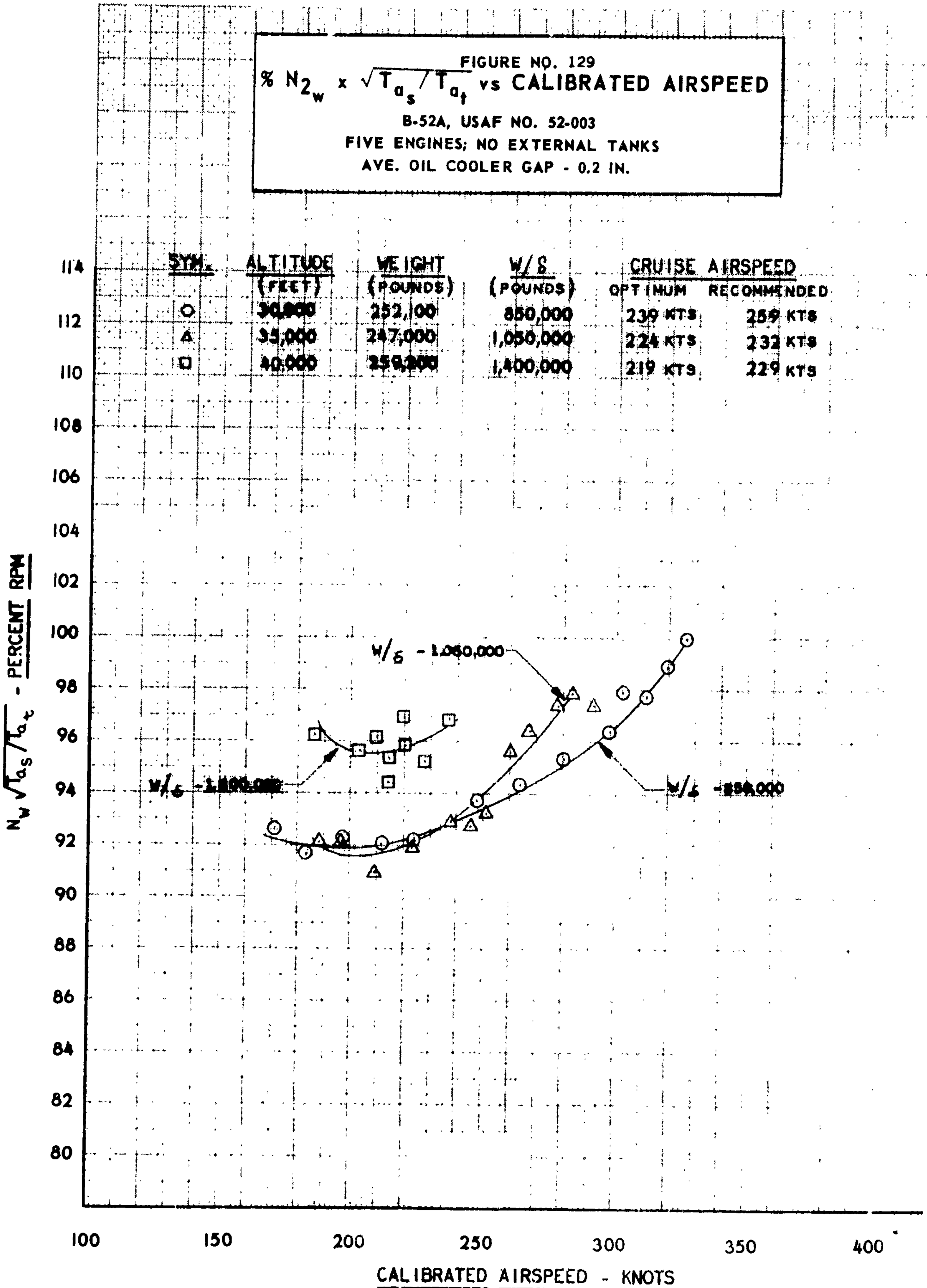


FIGURE NO. 129
% $N_{2_w} \times \sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED
B-52A, USAF NO. 52-003
FIVE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
CRUISE AIRSPEED
OPTIMUM
RECOMMENDED
○ 30,000 252,100 850,000 239 KTS 259 KTS
△ 35,000 247,000 1,050,000 224 KTS 232 KTS
□ 40,000 250,200 1,400,000 219 KTS 229 KTS
W/δ - 1,050,000
W/δ - 1,400,000
W/δ - 850,000
$N_w \sqrt{T_{a_s}/T_{a_t}}$ - PERCENT RPM
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
100
150
200
250
300
350
400
CALIBRATED AIRSPEED - KNOTS

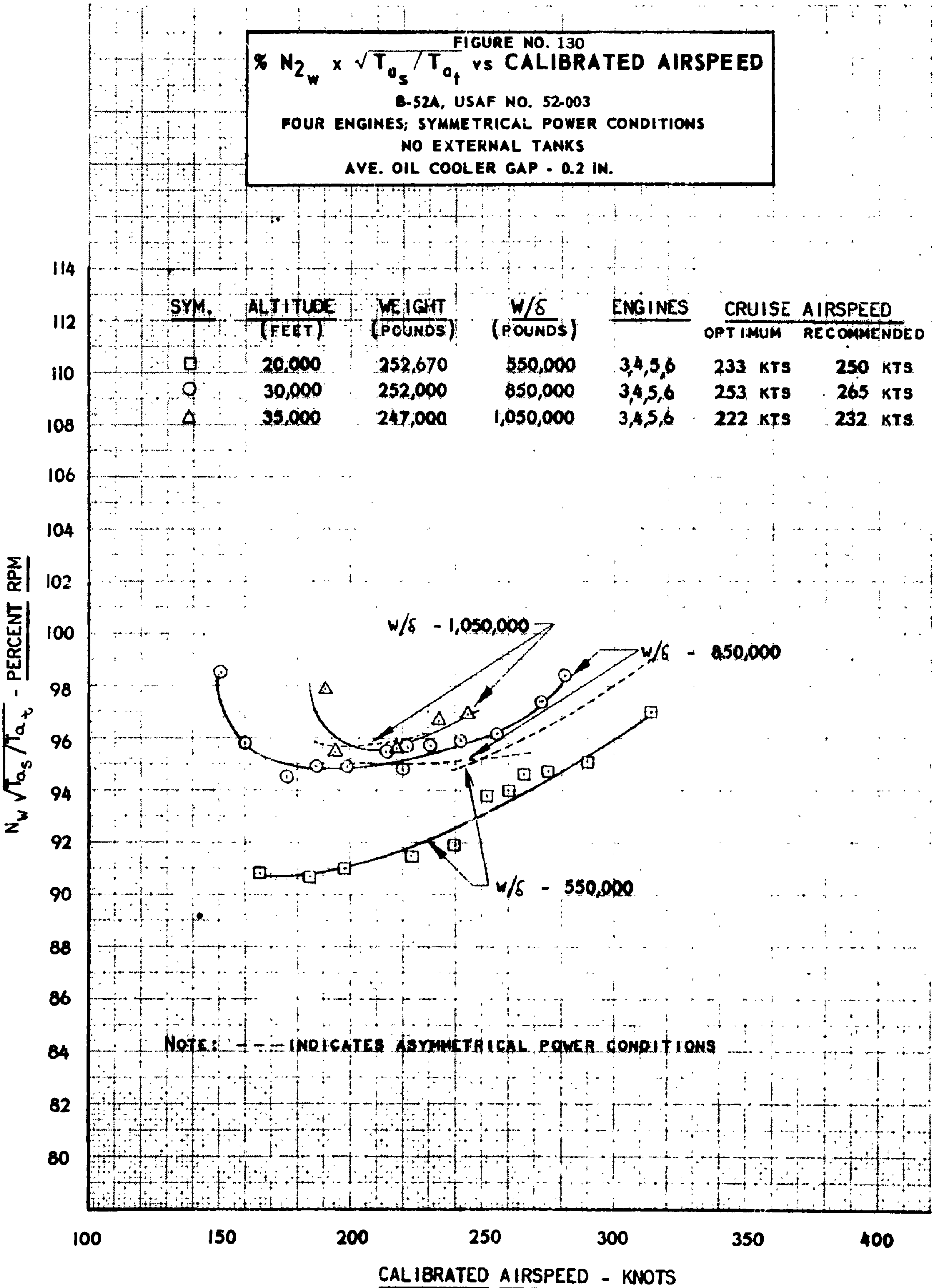


FIGURE NO. 130

% $N_{2_w} \times \sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED

B-52A, USAF NO. 52-003

FOUR ENGINES; SYMMETRICAL POWER CONDITIONS

NO EXTERNAL TANKS

AVE. OIL COOLER GAP - 0.2 IN.

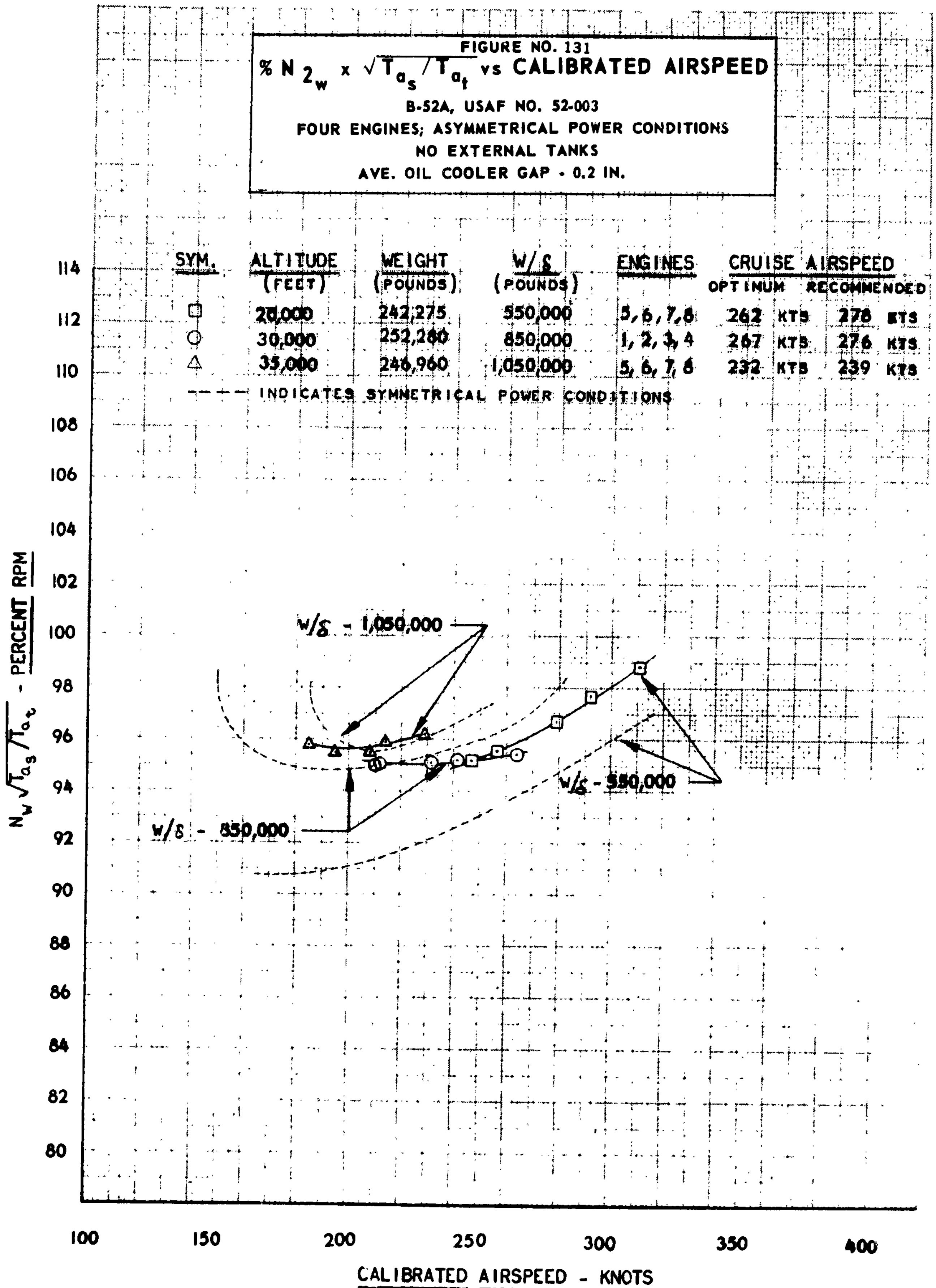


FIGURE NO. 131
% $N_{2_w} \times \sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED
B-52A, USAF NO. 52-003
FOUR ENGINES; ASYMMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM. | ALTITUDE (FEET) | WEIGHT (POUNDS) | W/δ (POUNDS) | ENGINES | CRUISE AIRSPEED OPTIMUM | RECOMMENDED
□ | 20,000 | 242,275 | 550,000 | 5, 6, 7, 8 | 262 KTS | 278 KTS
○ | 30,000 | 252,260 | 850,000 | 1, 2, 3, 4 | 267 KTS | 276 KTS
△ | 35,000 | 246,960 | 1,050,000 | 5, 6, 7, 8 | 232 KTS | 239 KTS
---- INDICATES SYMMETRICAL POWER CONDITIONS
W/δ - 1,050,000
W/δ - 850,000
W/δ - 550,000
$N_w \sqrt{T_{a_s}/T_{a_t}}$ - PERCENT RPM
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
100
150
200
250
300
350
400
CALIBRATED AIRSPEED - KNOTS

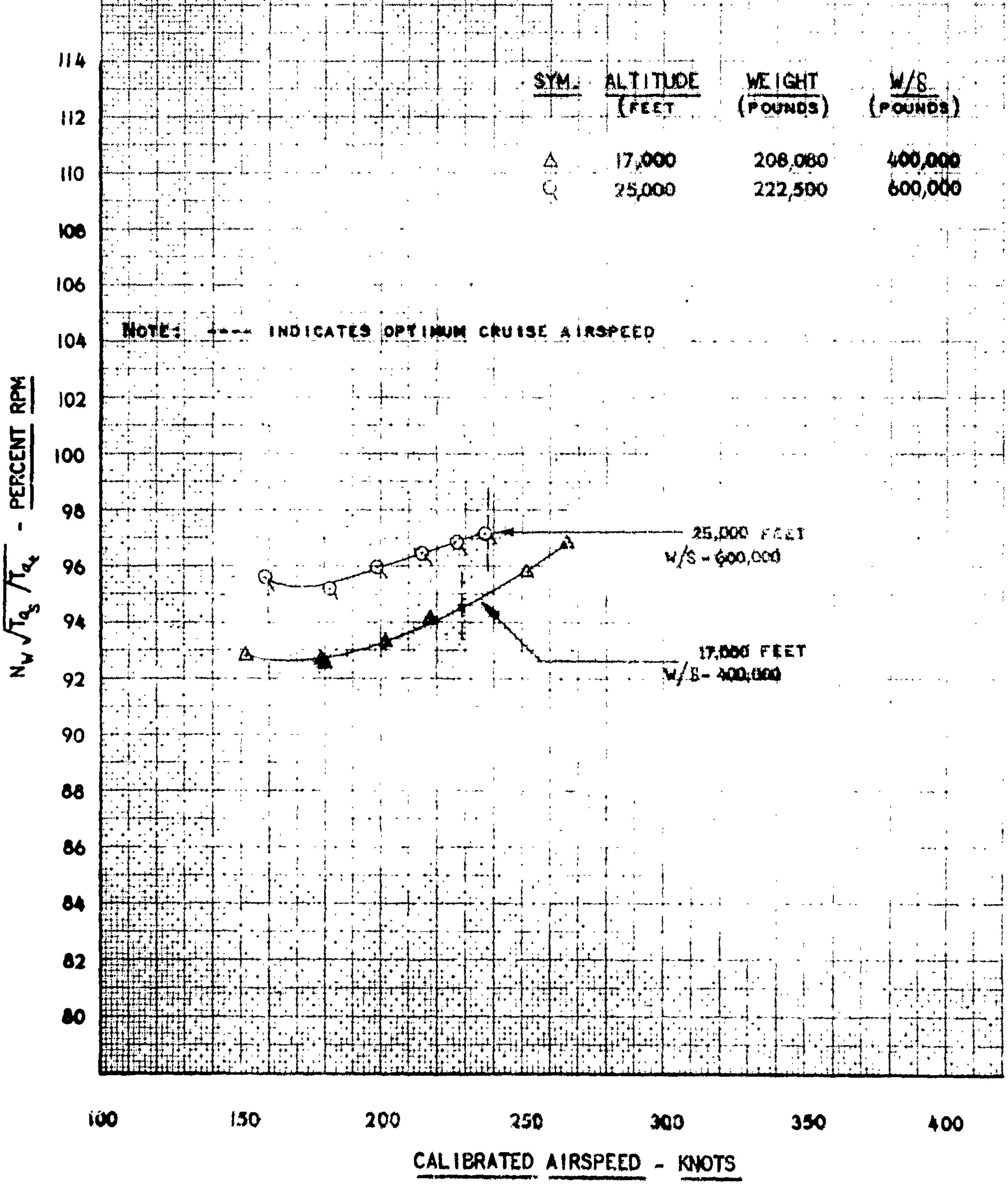
FIGURE NO. 132

$\% \ N_{2_W} \times \sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED

B-52A, USAF NO. 52-003

THREE ENGINES; NO EXTERNAL TANKS

AVE. OIL COOLER GAP - 0.2 IN.



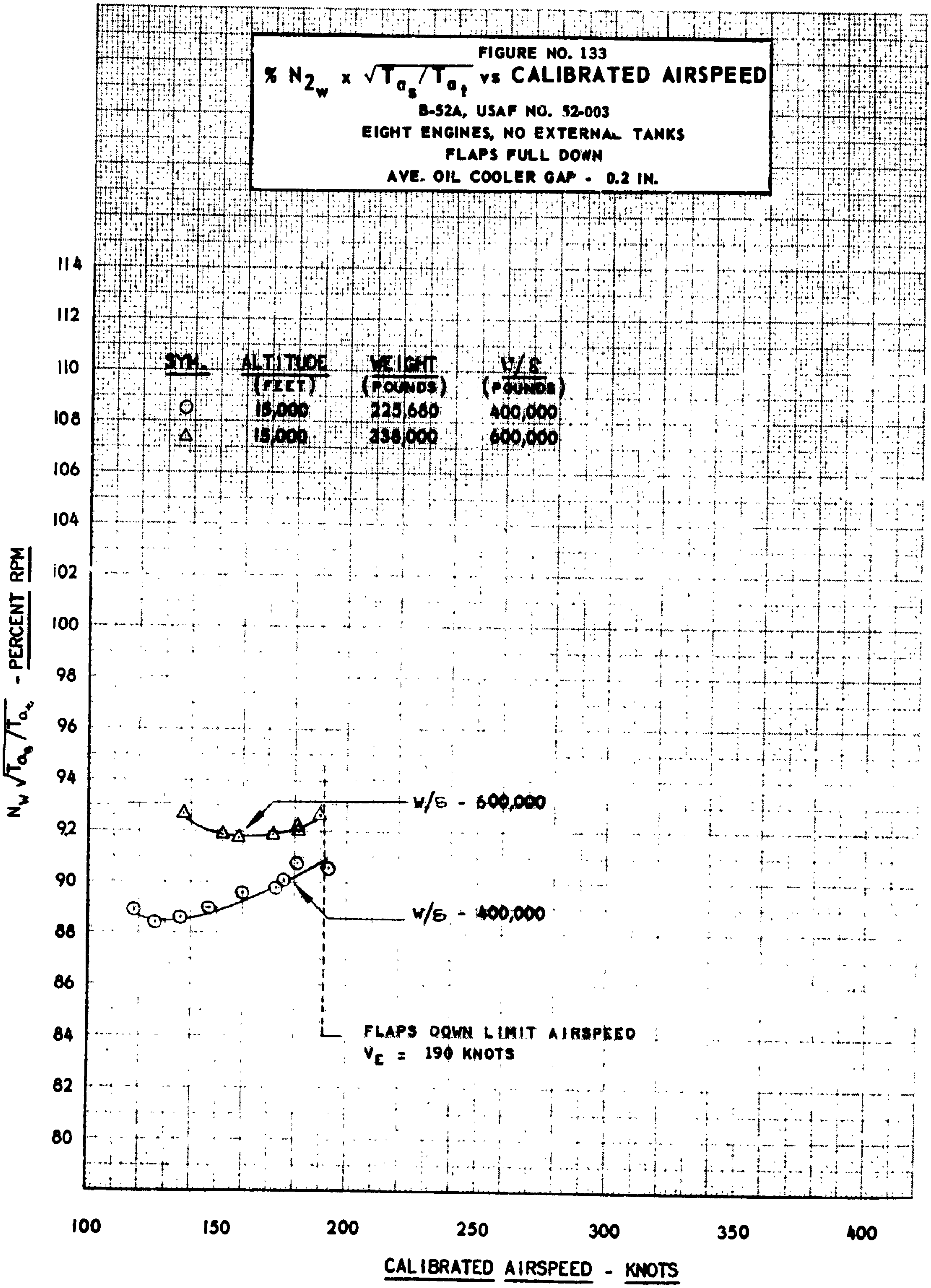


FIGURE NO. 133
% N_{2_w} x $\sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS FULL DOWN
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
15,000
225,680
400,000
15,000
338,000
600,000
W/δ - 600,000
W/δ - 400,000
FLAPS DOWN LIMIT AIRSPEED
V_E = 190 KNOTS
$N_W \sqrt{T_{a_s}/T_{a_t}}$ - PERCENT RPM
CALIBRATED AIRSPEED - KNOTS
80
82
84
86
88
90
92
94
96
98
100
102
104
106
108
110
112
114
100
150
200
250
300
350
400

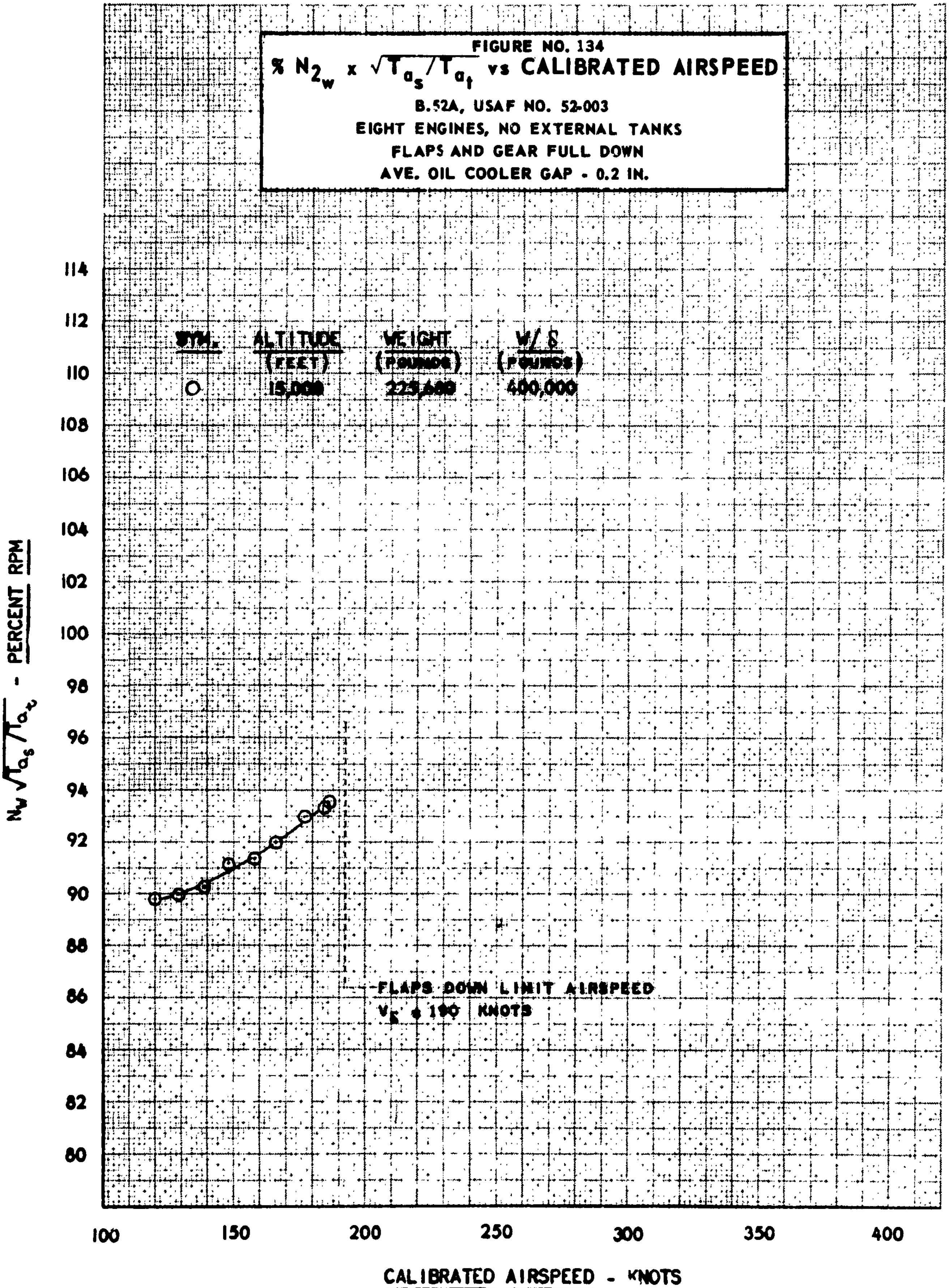


FIGURE NO. 134
% $N_{2_w} \times \sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED
B.52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS AND GEAR FULL DOWN
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/S (POUNDS)
15,000
400,000
FLAPS DOWN LIMIT AIRSPEED
V_L = 190 KNOTS
$N_W \sqrt{T_{a_s}/T_{a_t}}$ - PERCENT RPM
CALIBRATED AIRSPEED - KNOTS
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
100
150
200
250
300
350
400

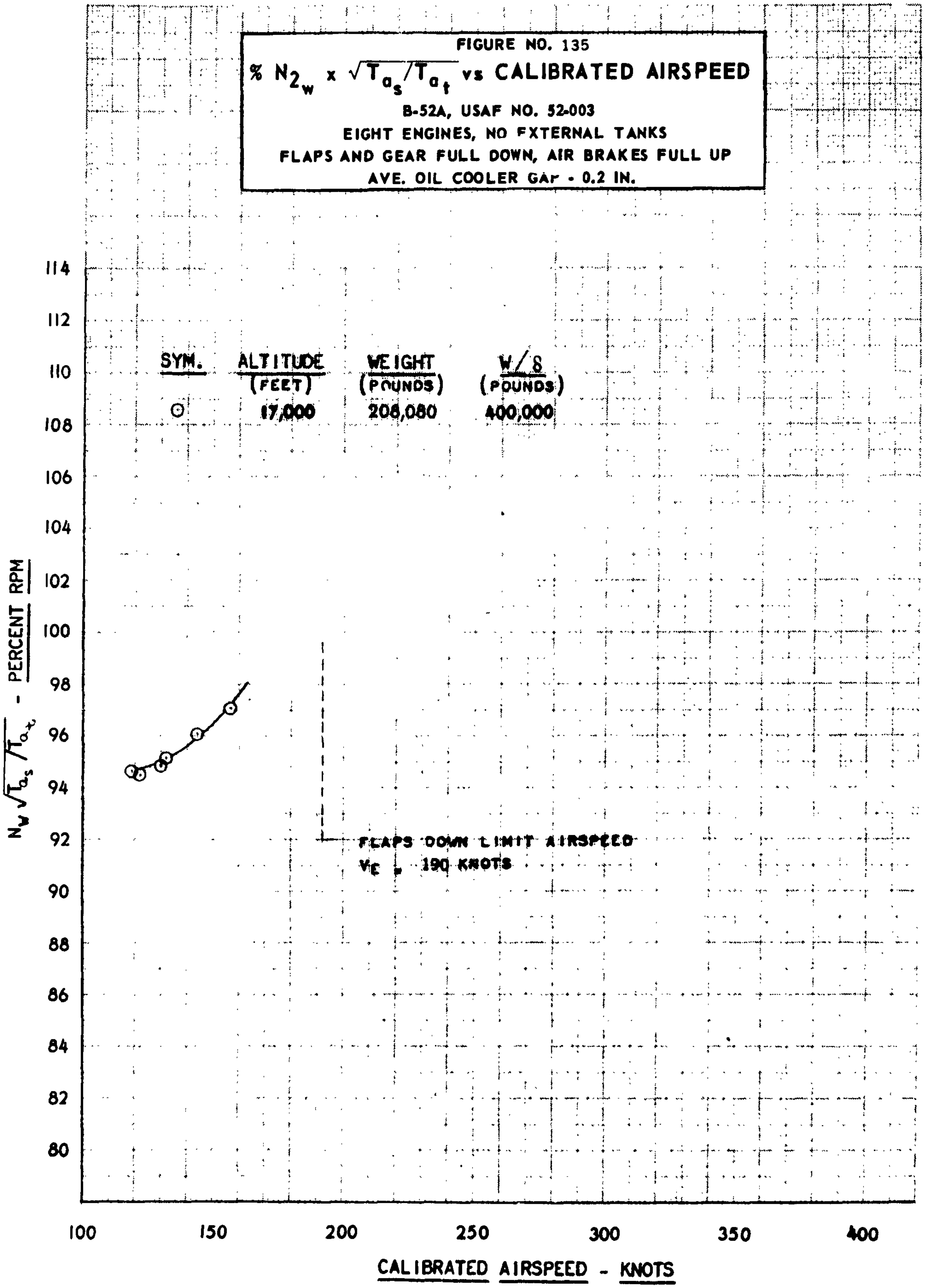


FIGURE NO. 135
% N_{2_w} x $\sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS AND GEAR FULL DOWN, AIR BRAKES FULL UP
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
17,000
208,080
400,000
FLAPS DOWN LIMIT AIRSPEED
V_E = 190 KNOTS
$N_W \sqrt{T_{a_s}/T_{a_t}}$ - PERCENT RPM
CALIBRATED AIRSPEED - KNOTS
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
100
150
200
250
300
350
400

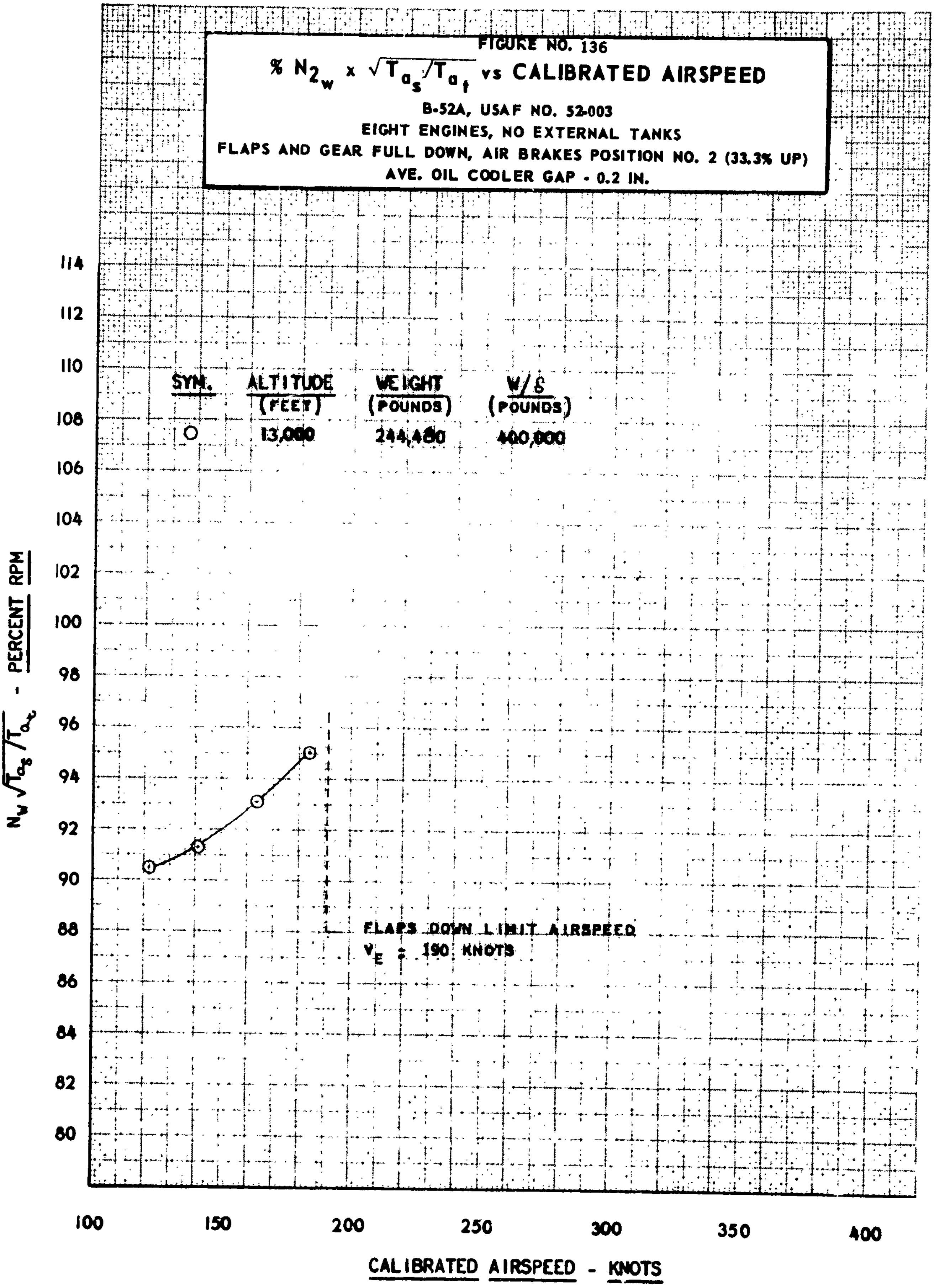


FIGURE NO. 136
% N_{2_w} x $\sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS AND GEAR FULL DOWN, AIR BRAKES POSITION NO. 2 (33.3% UP)
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
13,000
244,480
400,000
FLAPS DOWN LIMIT AIRSPEED
V_E = 190 KNOTS
$N_W \sqrt{T_{a_s}/T_{a_t}}$ - PERCENT RPM
114
112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
100
150
200
250
300
350
400
CALIBRATED AIRSPEED - KNOTS

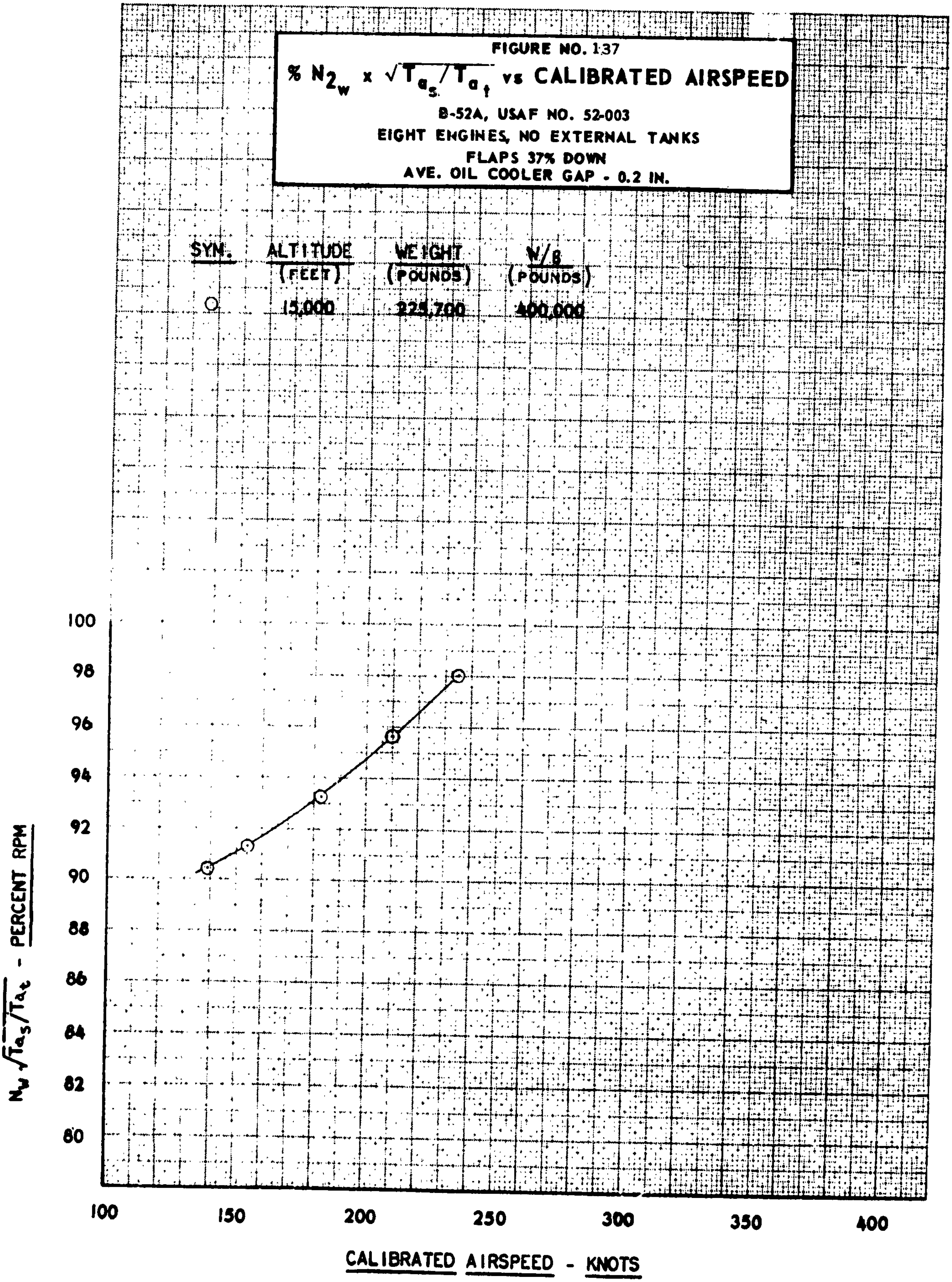


FIGURE NO. 137
% $N_{2_w} \times \sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS 37% DOWN
AVE. OIL COOLER GAP - 0.2 IN.
SYN. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
○ 15,000 225,700 400,000
$N_W \sqrt{Ta_s/Ta_t}$ - PERCENT RPM
100
98
96
94
92
90
88
86
84
82
80
100
150
200
250
300
350
400
CALIBRATED AIRSPEED - KNOTS

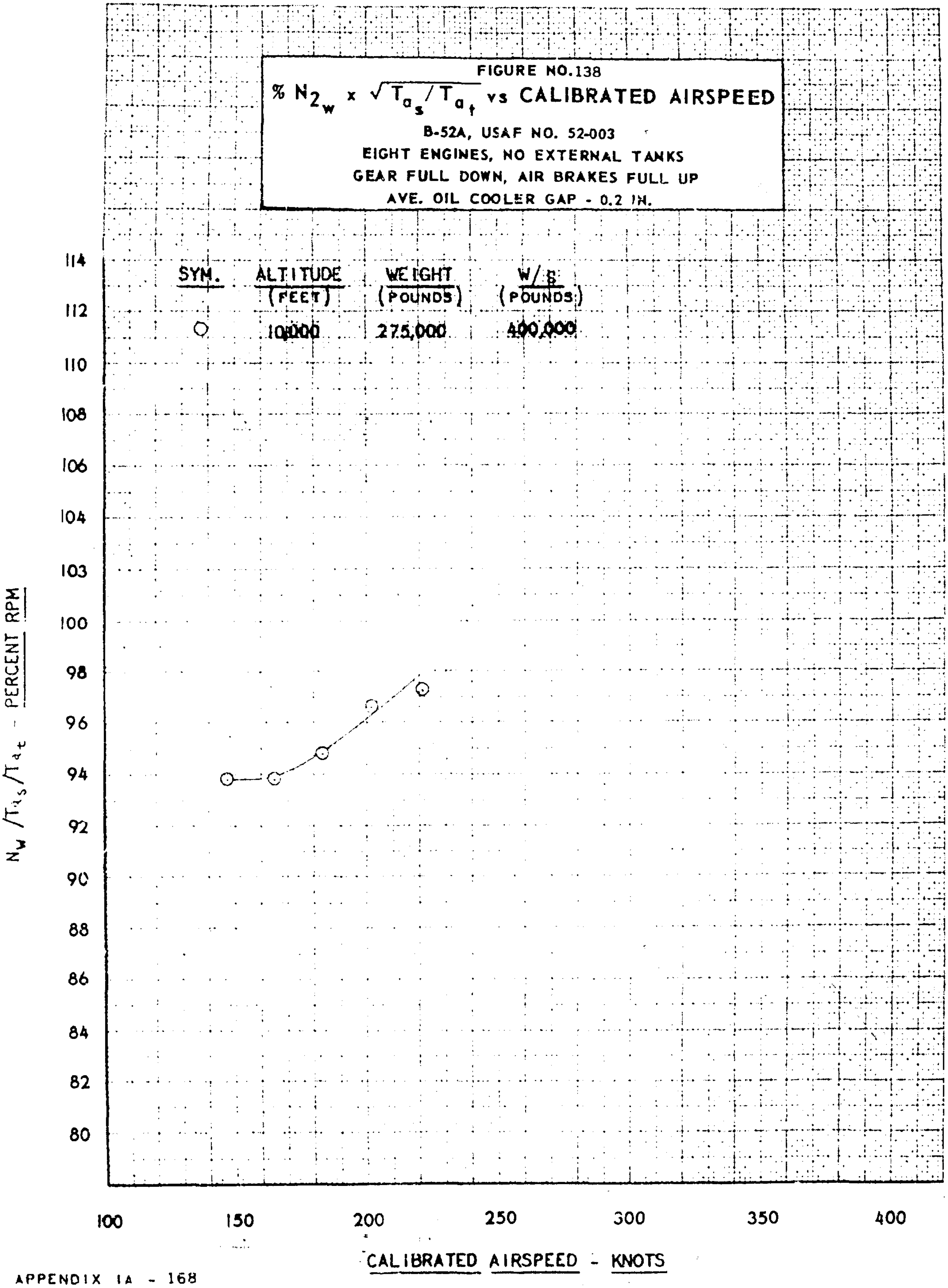


FIGURE NO.138
% N_{2_w} x $\sqrt{T_{a_s}/T_{a_t}}$ vs CALIBRATED AIRSPEED
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
GEAR FULL DOWN, AIR BRAKES FULL UP
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
10,000
275,000
400,000
114
112
110
108
106
104
103
100
98
96
94
92
90
88
86
84
82
80
$N_W / T_{a_s} / T_{a_t}$ - PERCENT RPM
100
150
200
250
300
350
400
CALIBRATED AIRSPEED - KNOTS

DRAG POLARS

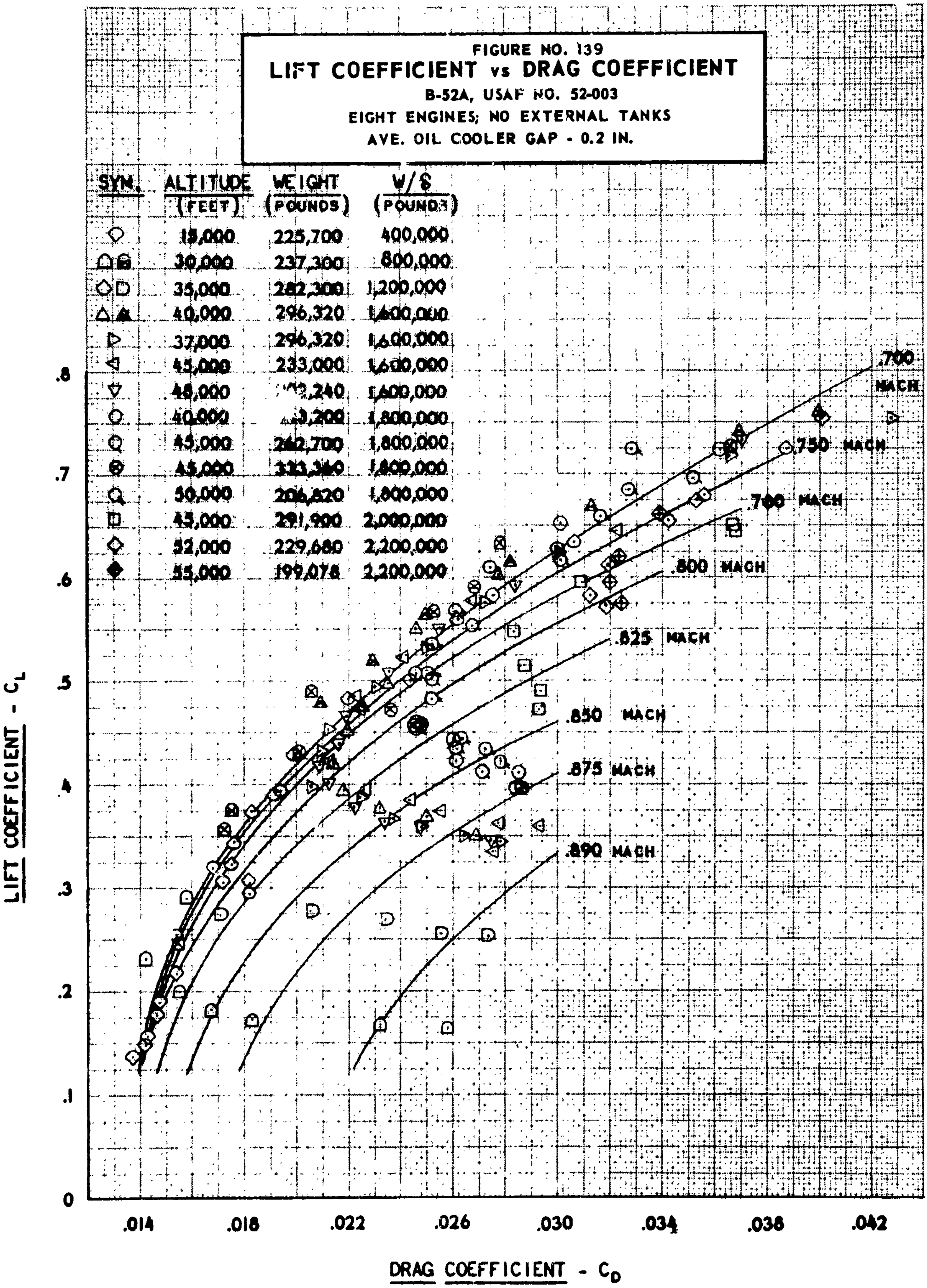


FIGURE NO. 139
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
15,000 225,700 400,000
30,000 237,300 800,000
35,000 282,300 1,200,000
40,000 296,320 1,600,000
37,000 296,320 1,600,000
45,000 233,000 1,600,000
48,000 ,240 1,600,000
40,000 3,200 1,800,000
45,000 262,700 1,800,000
45,000 333,360 1,800,000
50,000 206,820 1,800,000
45,000 291,900 2,000,000
52,000 229,680 2,200,000
55,000 199,078 2,200,000
.700 MACH
.750 MACH
.700 MACH
.800 MACH
.825 MACH
.850 MACH
.875 MACH
.890 MACH
LIFT COEFFICIENT - C_L
DRAG COEFFICIENT - C_D
0
.1
.2
.3
.4
.5
.6
.7
.8
.014
.018
.022
.026
.030
.034
.038
.042

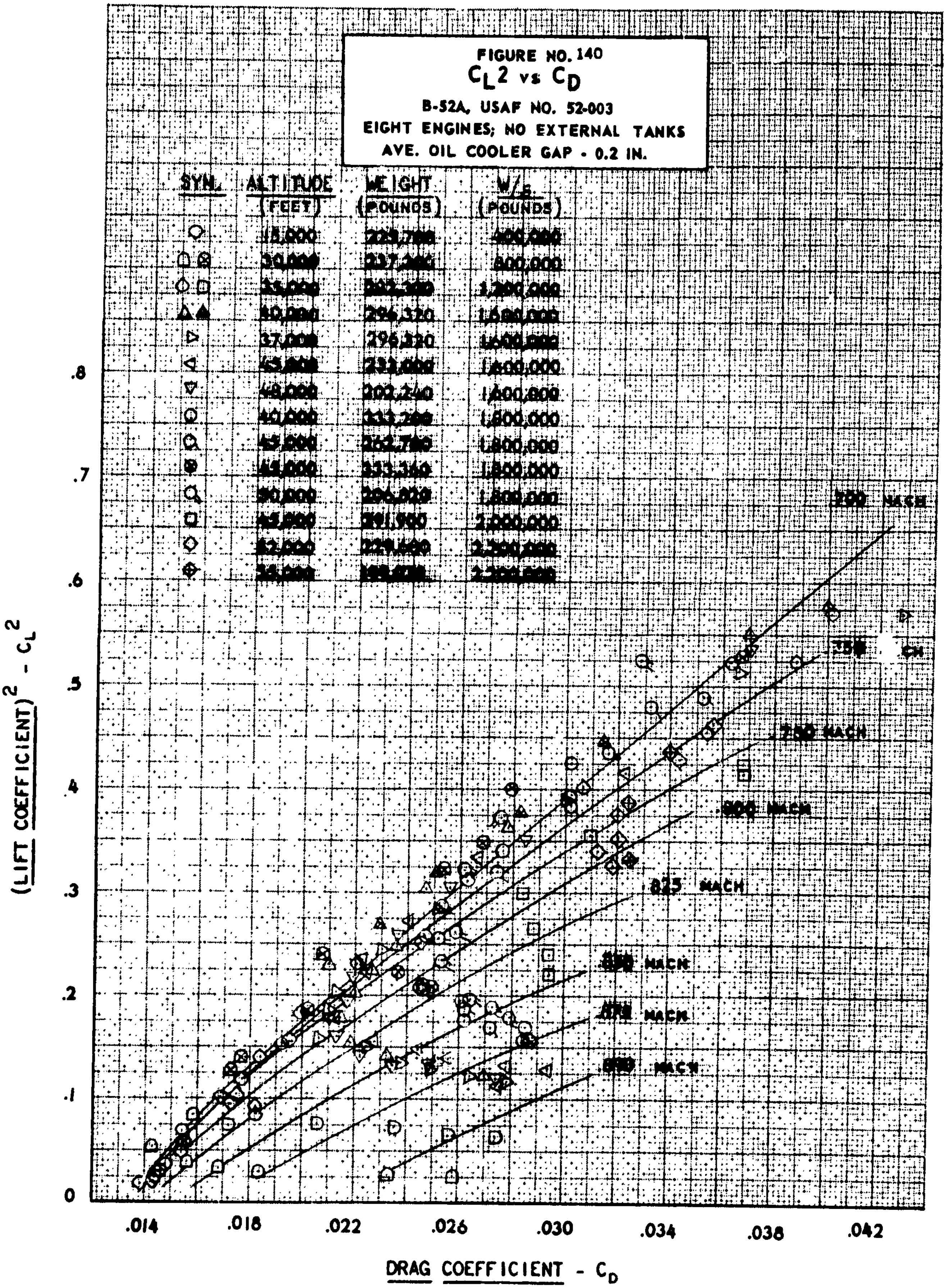


FIGURE NO. 140
$C_L 2$ vs C_D
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
.825 MACH
(LIFT COEFFICIENT)^2 - C_L^2
DRAG COEFFICIENT - C_D
0
.1
.2
.3
.4
.5
.6
.7
.8
.014
.018
.022
.026
.030
.034
.038
.042

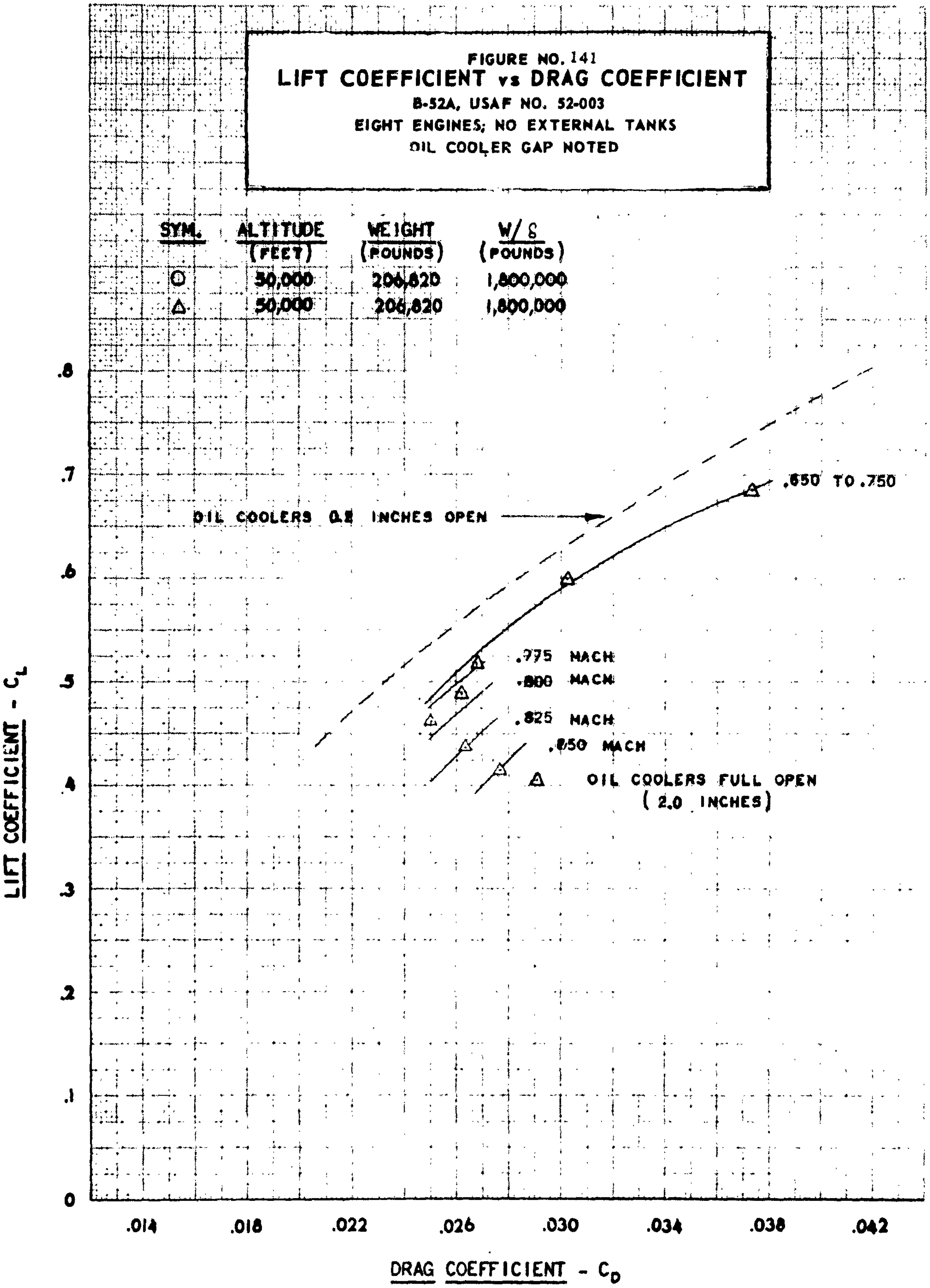


FIGURE NO. 141
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
OIL COOLER GAP NOTED
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
50,000
206,820
1,800,000
50,000
206,820
1,800,000
.850 TO .750
OIL COOLERS 0.2 INCHES OPEN
.775 MACH
.800 MACH
.825 MACH
.850 MACH
OIL COOLERS FULL OPEN (2.0 INCHES)
LIFT COEFFICIENT - C_L
DRAG COEFFICIENT - C_D
.8
.7
.6
.5
.4
.3
.2
.1
0
.014
.018
.022
.026
.030
.034
.038
.042

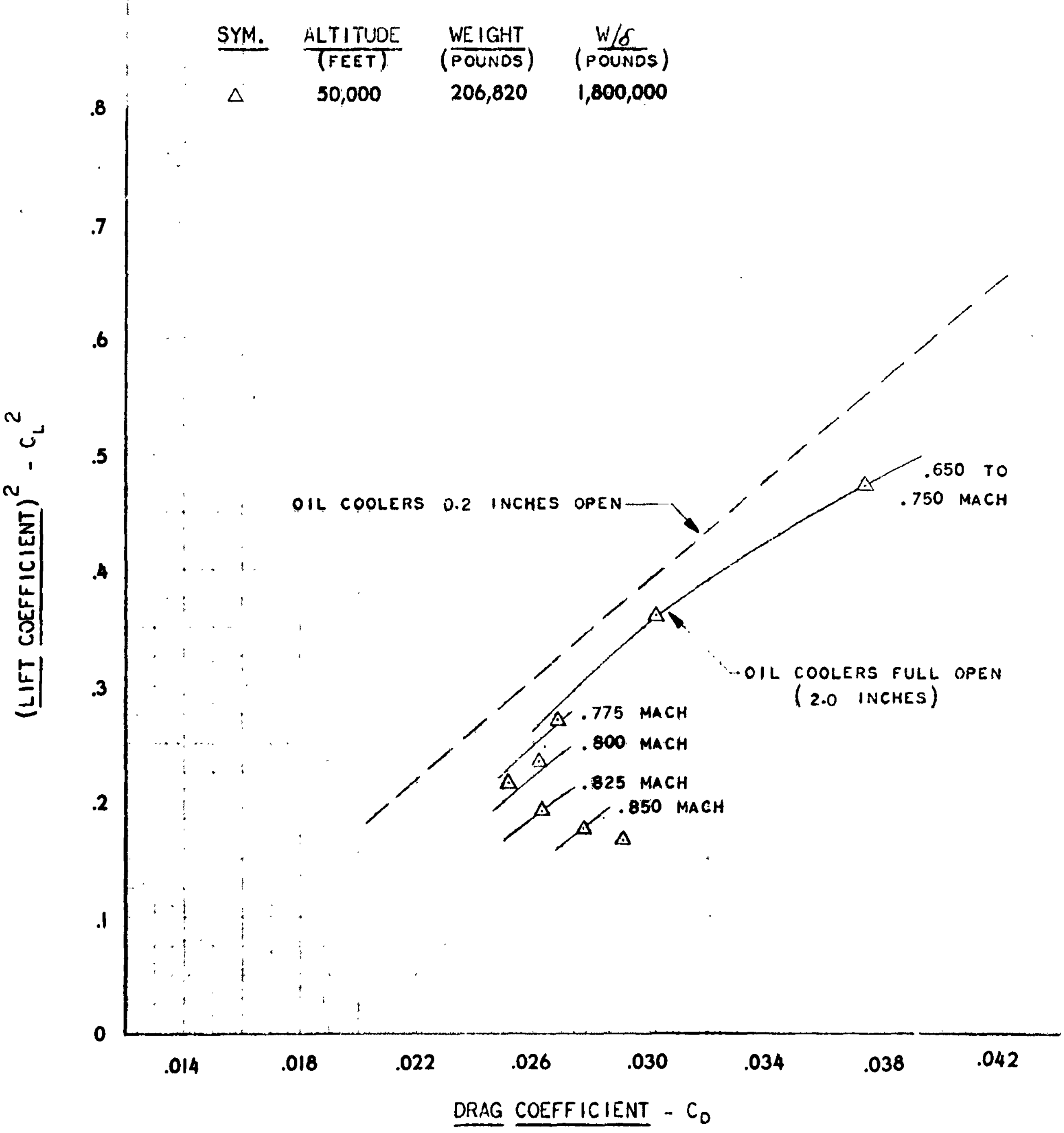
FIGURE NO. 142

C_L2 vs C_D

B-52A, USAF NO. 52-003

EIGHT ENGINES; NO EXTERNAL TANKS

OIL COOLER GAP NOTED



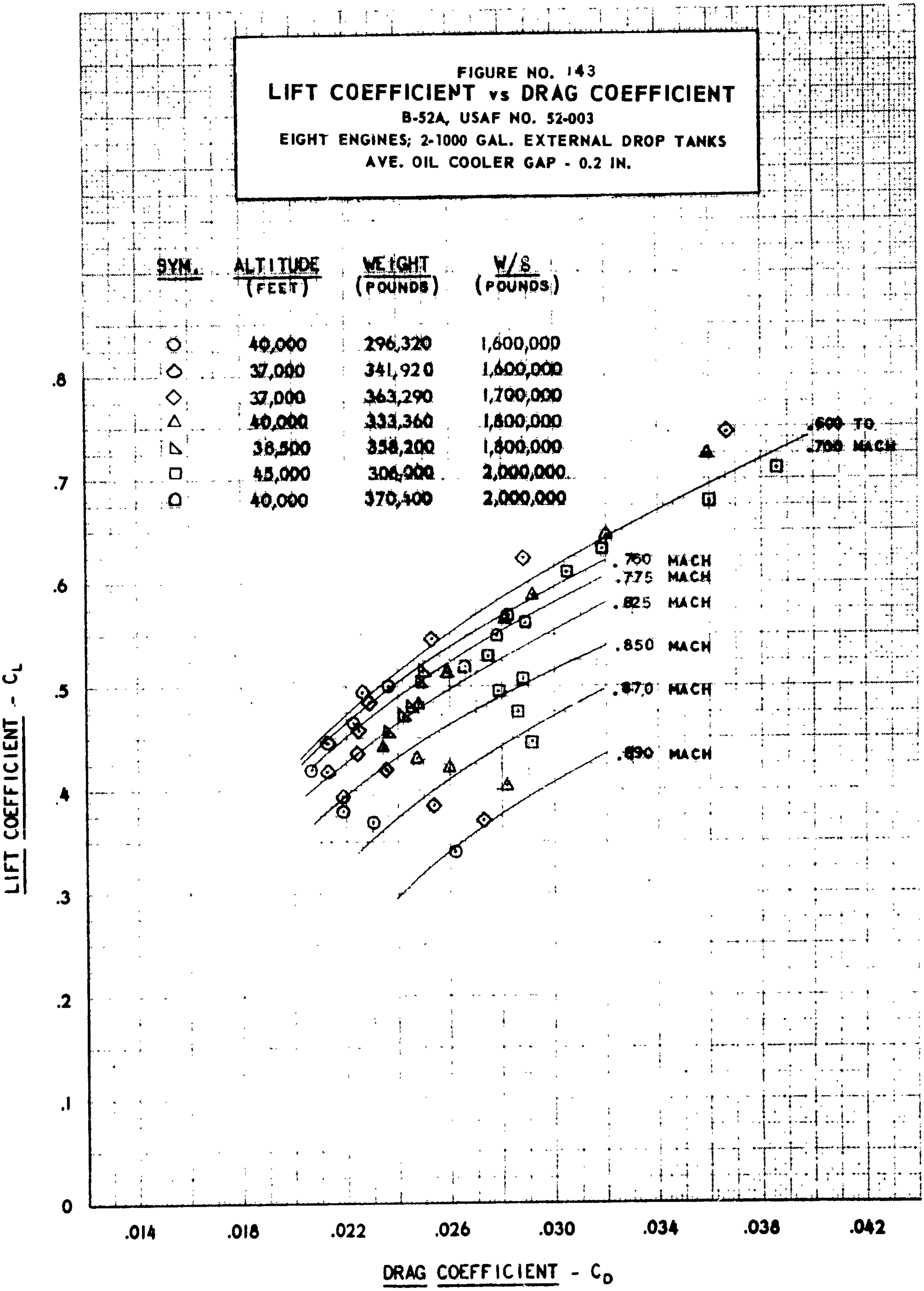


FIGURE NO. 143
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
EIGHT ENGINES; 2-1000 GAL. EXTERNAL DROP TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/S (POUNDS)
40,000 296,320 1,600,000
37,000 341,920 1,600,000
37,000 363,290 1,700,000
40,000 333,360 1,800,000
38,500 358,200 1,800,000
45,000 306,900 2,000,000
40,000 370,400 2,000,000
.600 TO .700 MACH
.760 MACH
.775 MACH
.825 MACH
.850 MACH
.870 MACH
.890 MACH
LIFT COEFFICIENT - C_L
DRAG COEFFICIENT - C_D
0
.1
.2
.3
.4
.5
.6
.7
.8
.014
.018
.022
.026
.030
.034
.038
.042

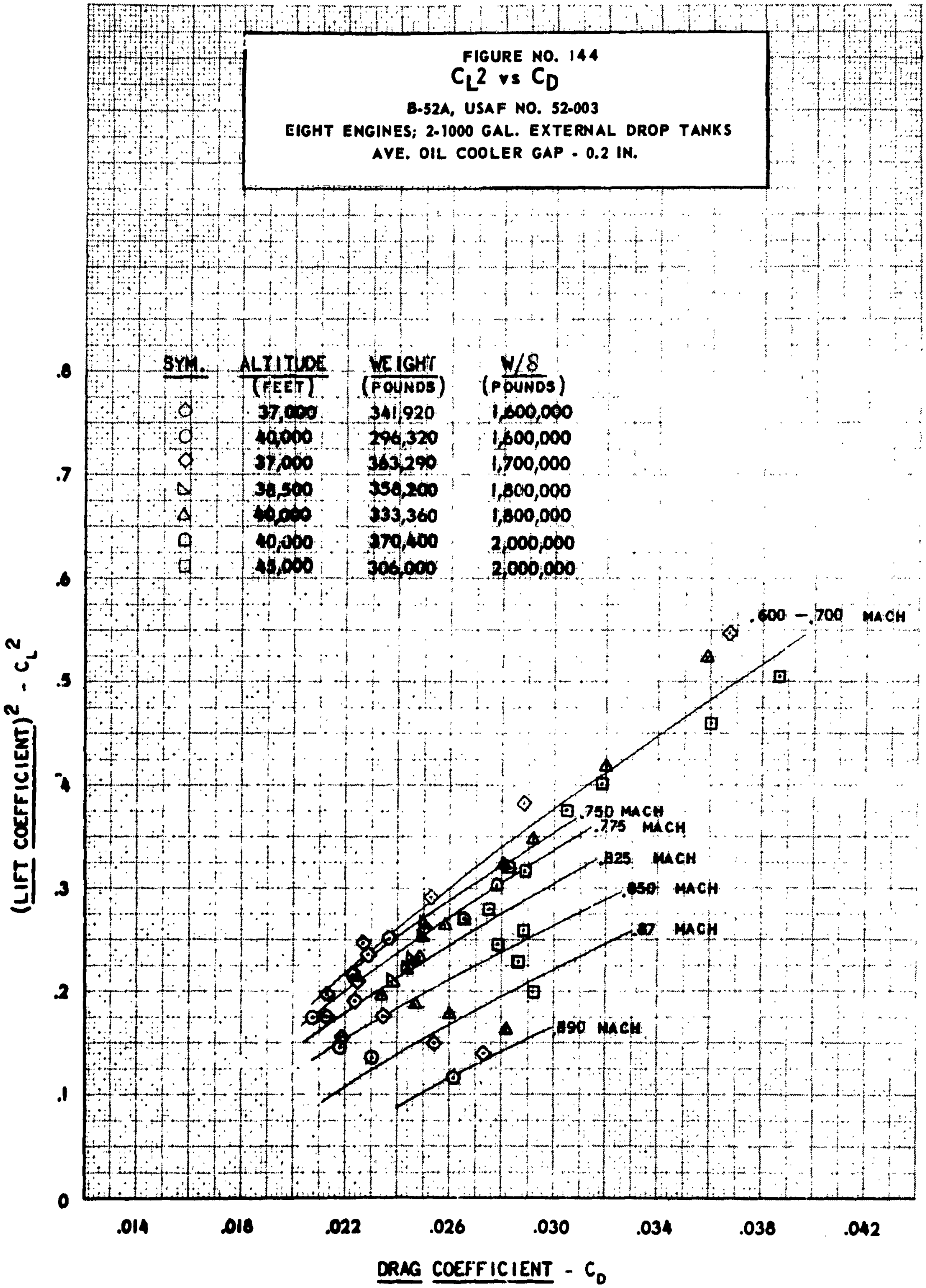
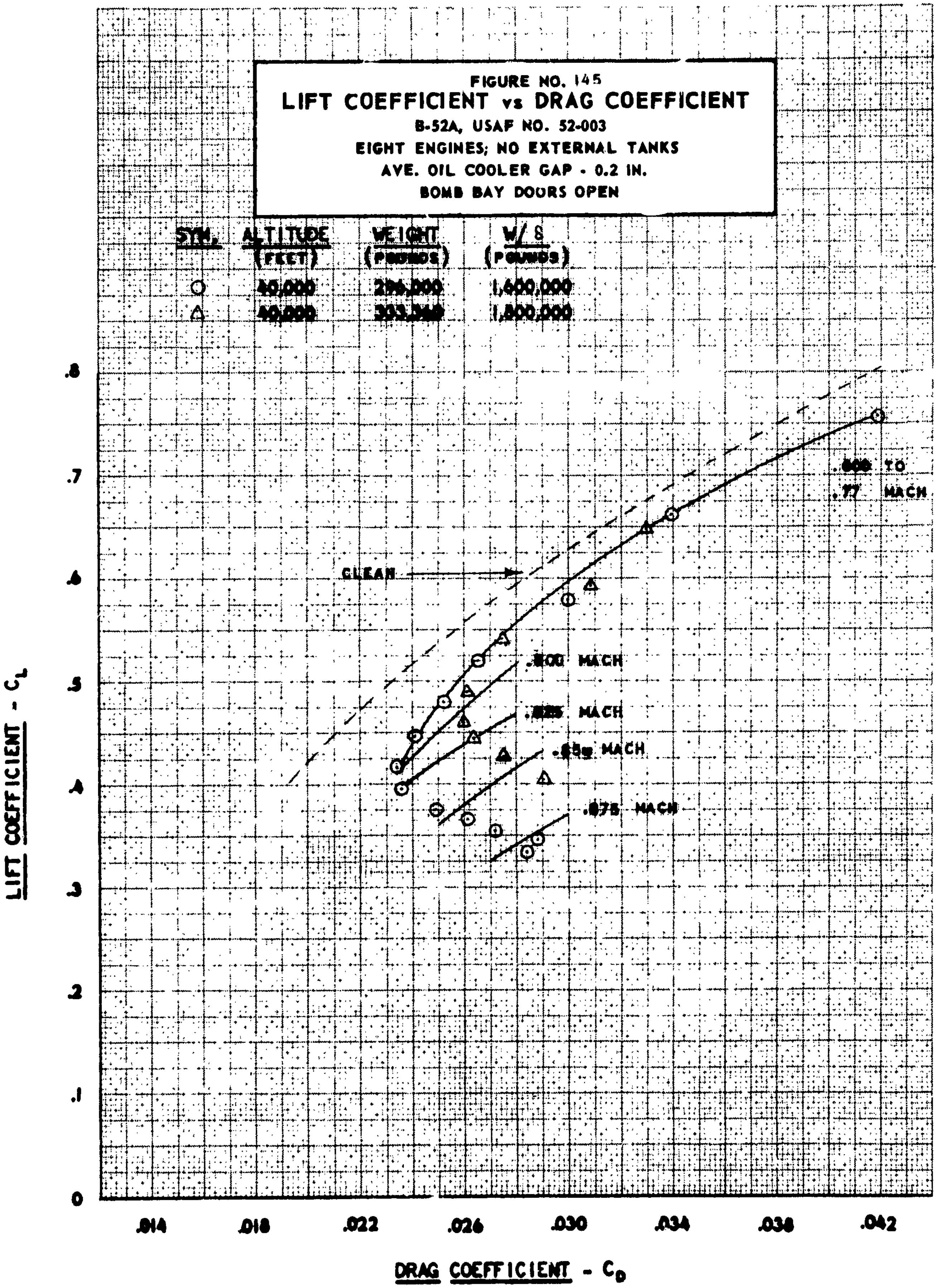


FIGURE NO. 144
C_L2 vs C_D
B-52A, USAF NO. 52-003
EIGHT ENGINES; 2-1000 GAL. EXTERNAL DROP TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
37,000 341,920 1,600,000
40,000 296,320 1,600,000
37,000 363,290 1,700,000
38,500 358,200 1,800,000
40,000 333,360 1,800,000
40,000 370,400 2,000,000
45,000 306,000 2,000,000
.600 — .700 MACH
.750 MACH
.775 MACH
.825 MACH
.850 MACH
.87 MACH
.890 MACH
(LIFT COEFFICIENT)^2 - C_L^2
DRAG COEFFICIENT - C_D
0
.1
.2
.3
.4
.5
.6
.7
.8
.014
.018
.022
.026
.030
.034
.038
.042

FIGURE NO. 145
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
BOMB BAY DOORS OPEN



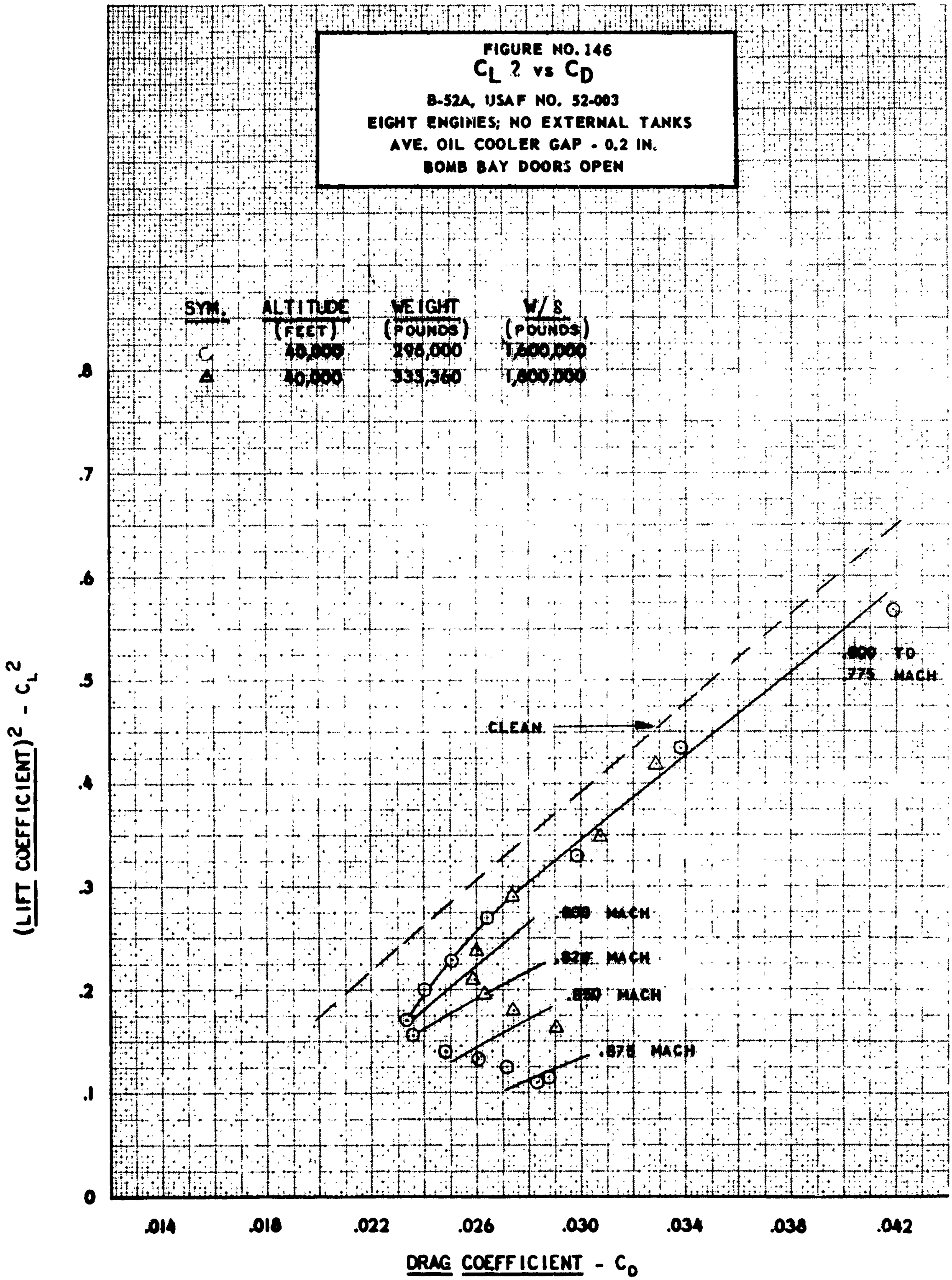


FIGURE NO. 146
C_L^2 vs C_D
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
BOMB BAY DOORS OPEN

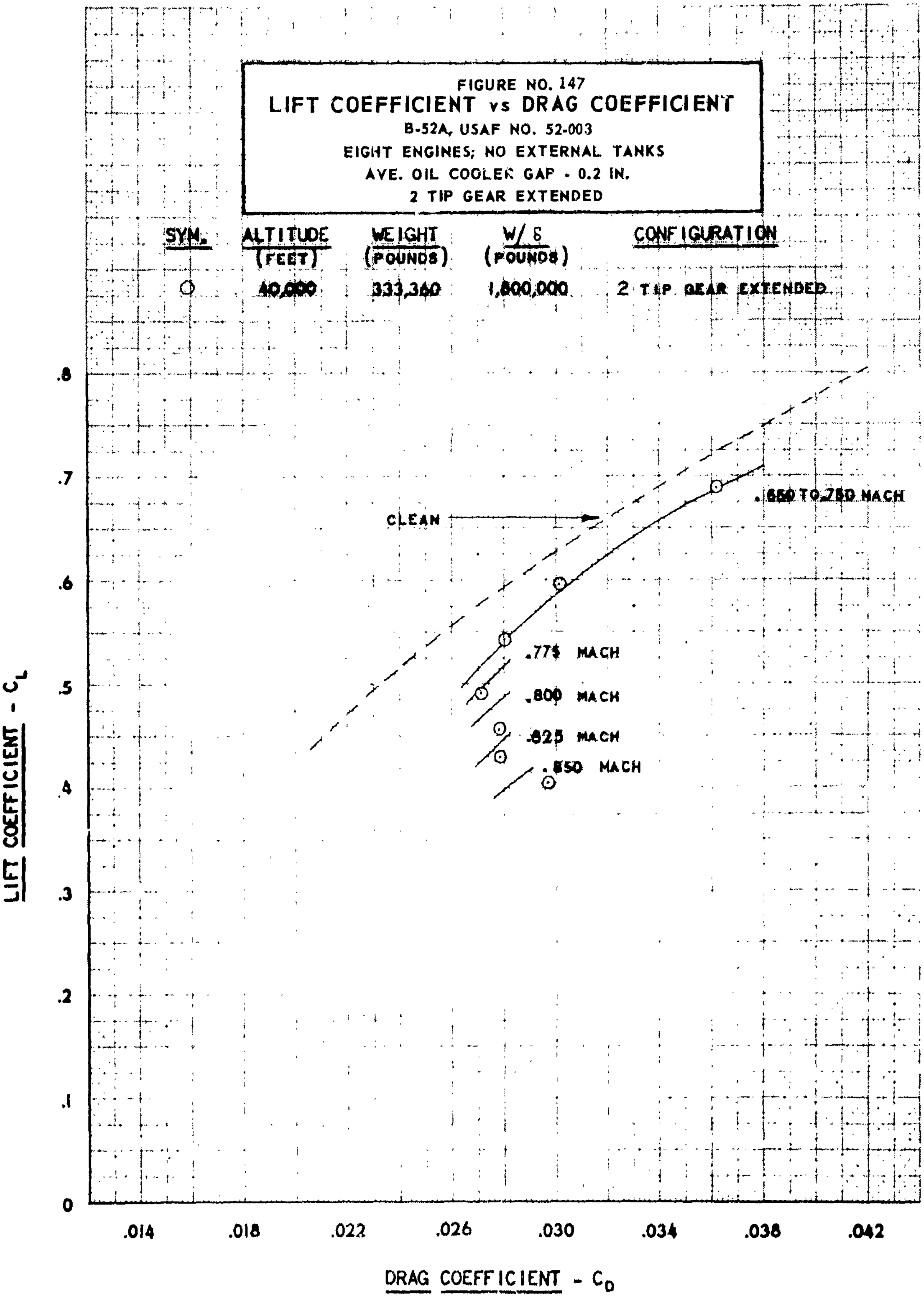


FIGURE NO. 147
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
2 TIP GEAR EXTENDED
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
CONFIGURATION
40,000
333,360
1,800,000
2 TIP GEAR EXTENDED
CLEAN
.650 TO .750 MACH
.775 MACH
.800 MACH
.825 MACH
.850 MACH
LIFT COEFFICIENT - C_L
DRAG COEFFICIENT - C_D
0
.1
.2
.3
.4
.5
.6
.7
.8
.014
.018
.022
.026
.030
.034
.038
.042

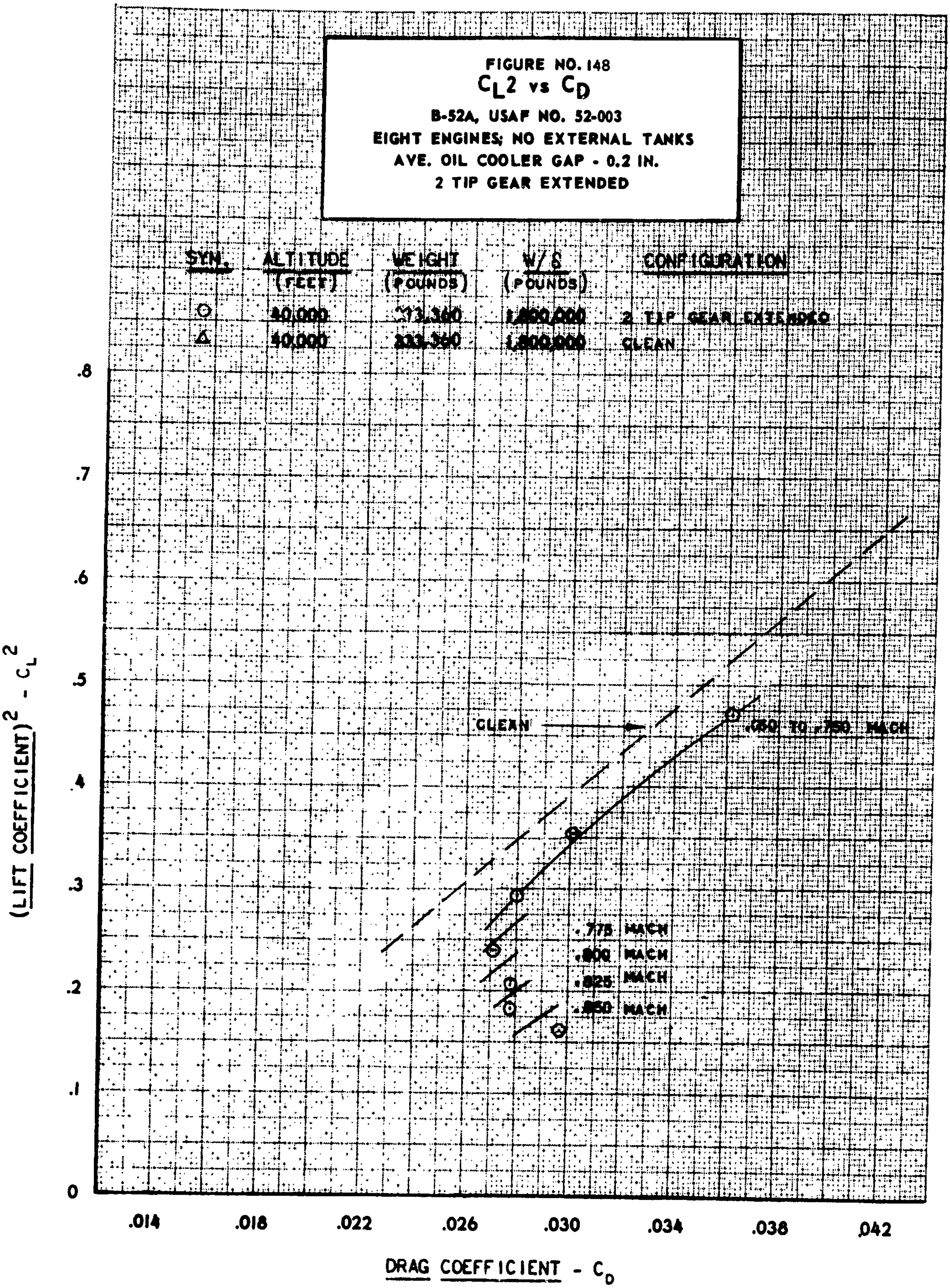


FIGURE NO. 148
C_L2 vs C_D
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
2 TIP GEAR EXTENDED
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
CONFIGURATION
40,000
CLEAN
.8
.7
.6
.5
.4
.3
.2
.1
0
.014
.018
.022
.026
.030
.034
.038
.042
CLEAN
MACH
.775 MACH
.800 MACH
.825 MACH
.850 MACH
(LIFT COEFFICIENT)^2 - C_L^2
DRAG COEFFICIENT - C_D

FIGURE NO. 149
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
SEVEN ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN

SYM.	ALTITUDE (FEET)	WEIGHT (POUNDS)	W/δ (POUNDS)
□	37,000	241,920	1,600,000
△	40,000	314,800	1,700,000
○	42,000	319,770	1,900,000

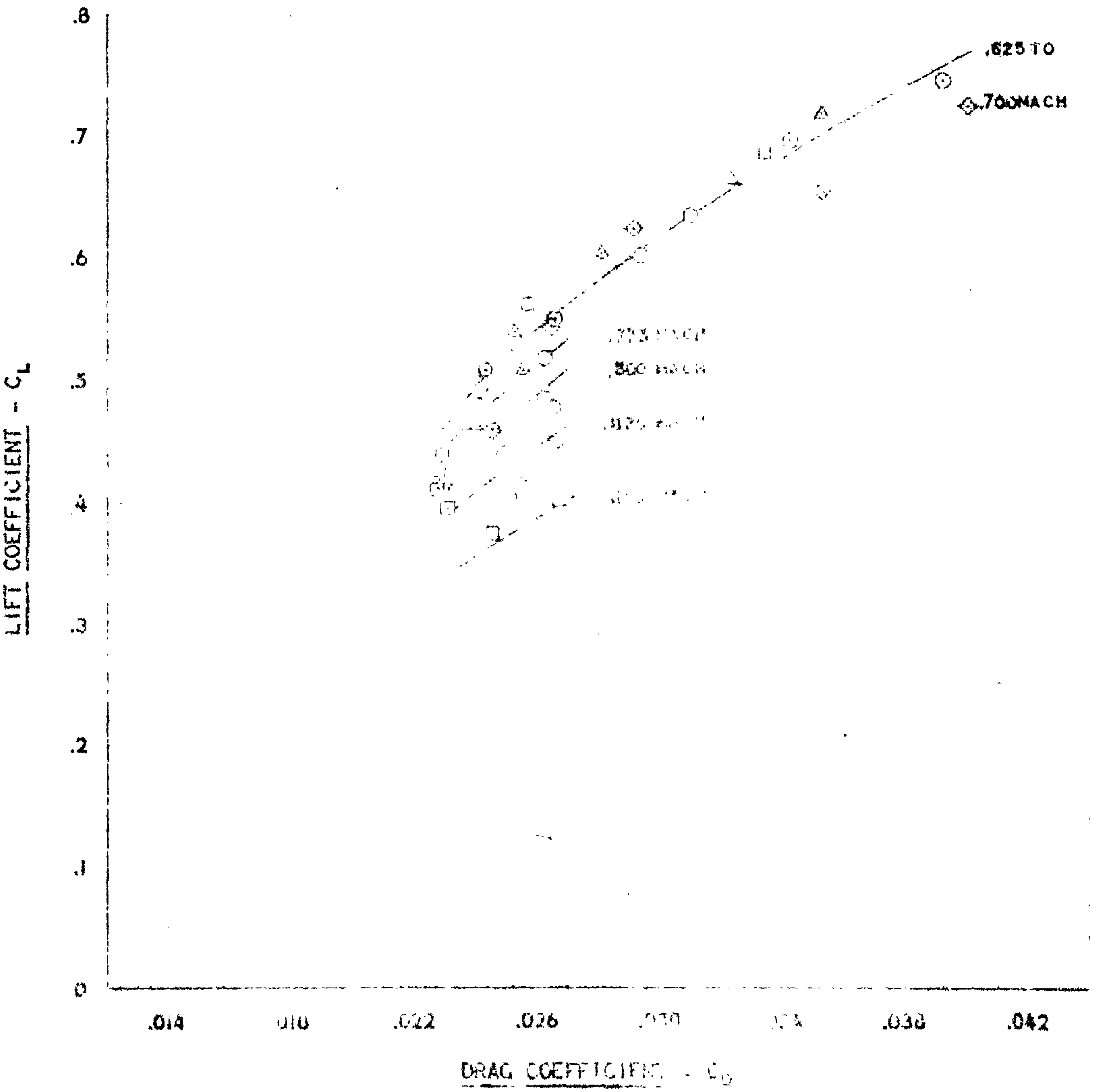


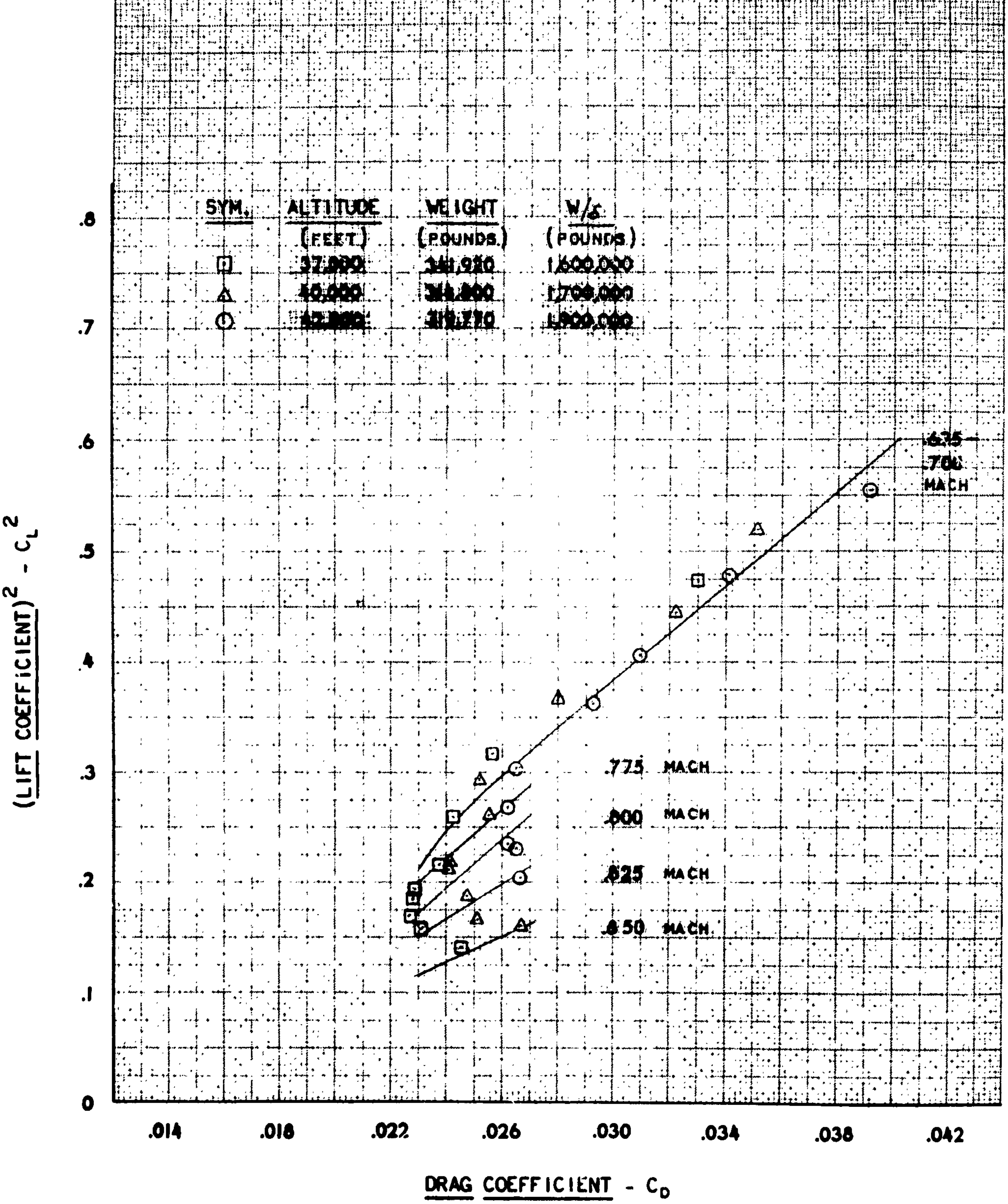
FIGURE NO. 150

C_L2 vs C_D

B-52A, USAF NO. 52-003

SEVEN ENGINES; NO EXTERNAL TANKS

AVE. OIL COOLER GAP - 0.2 IN.



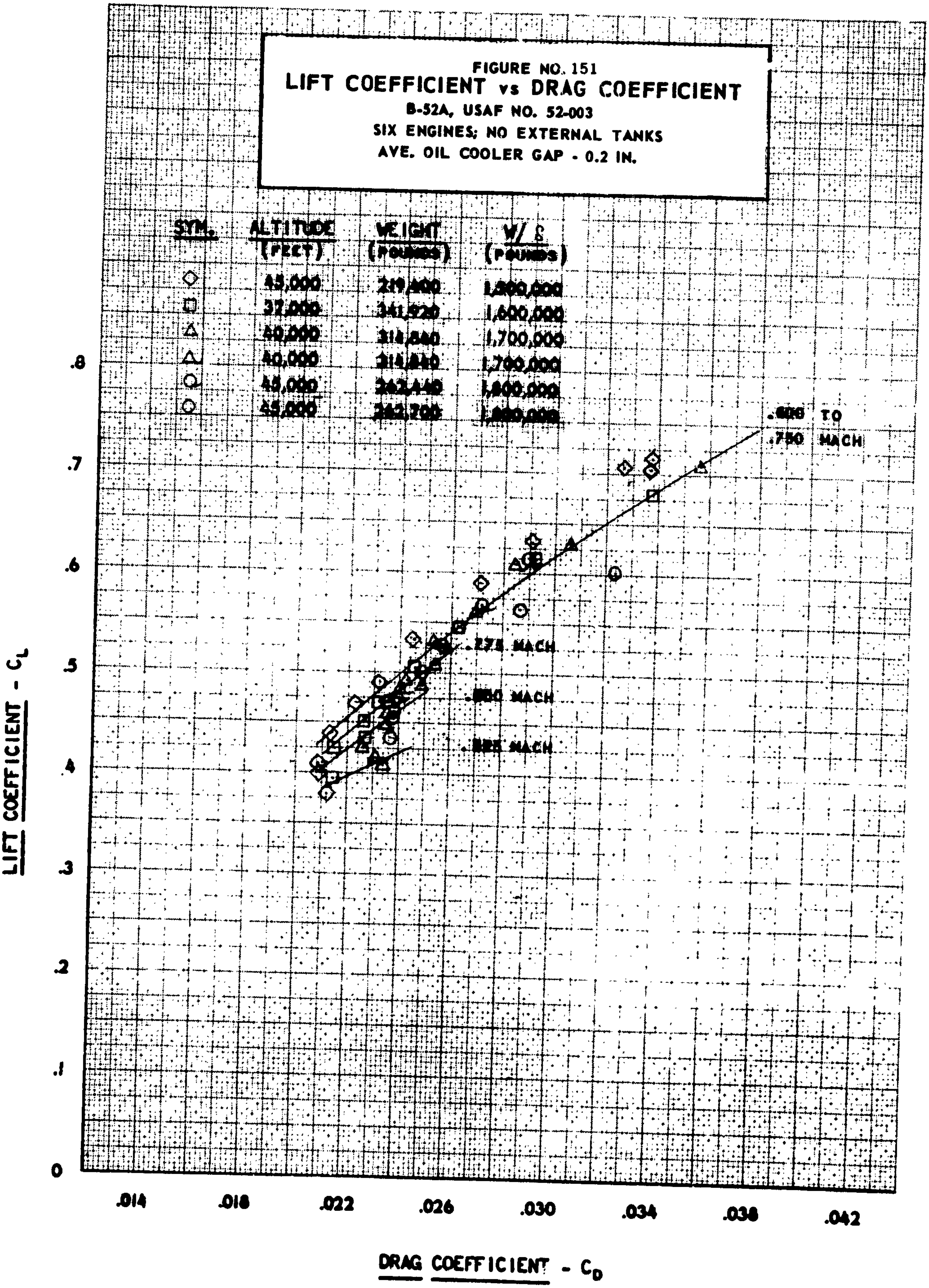


FIGURE NO. 151
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
SIX ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

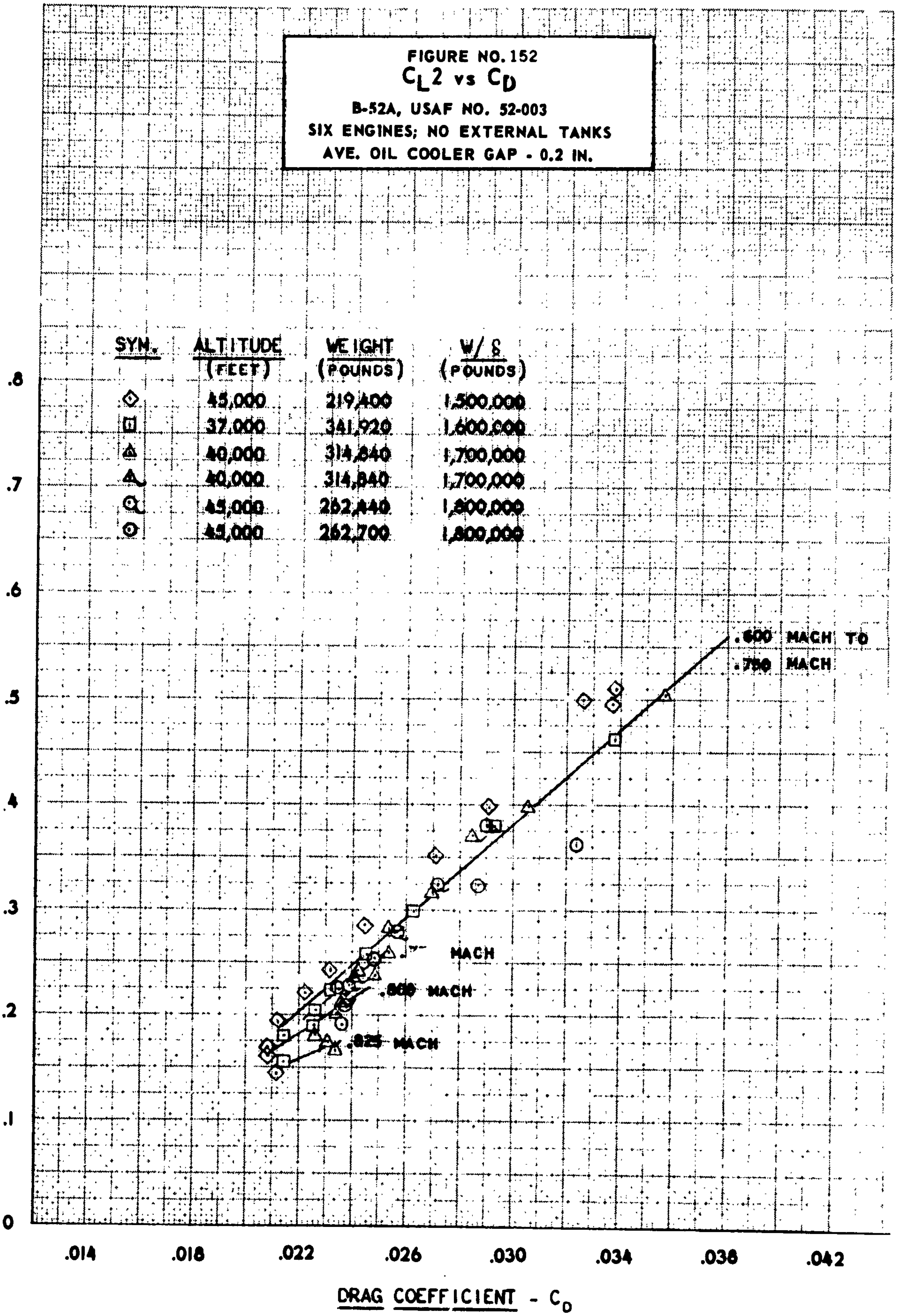


FIGURE NO. 152
$C_L{}^2$ vs C_D
B-52A, USAF NO. 52-003
SIX ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
45,000 219,400 1,500,000
37,000 341,920 1,600,000
40,000 314,840 1,700,000
40,000 314,840 1,700,000
45,000 262,440 1,800,000
45,000 262,700 1,800,000
.600 MACH TO
.750 MACH
MACH
.800 MACH
.825 MACH
(LIFT COEFFICIENT)^2 - $C_L{}^2$
DRAG COEFFICIENT - C_D
0
.1
.2
.3
.4
.5
.6
.7
.8
.014
.018
.022
.026
.030
.034
.038
.042

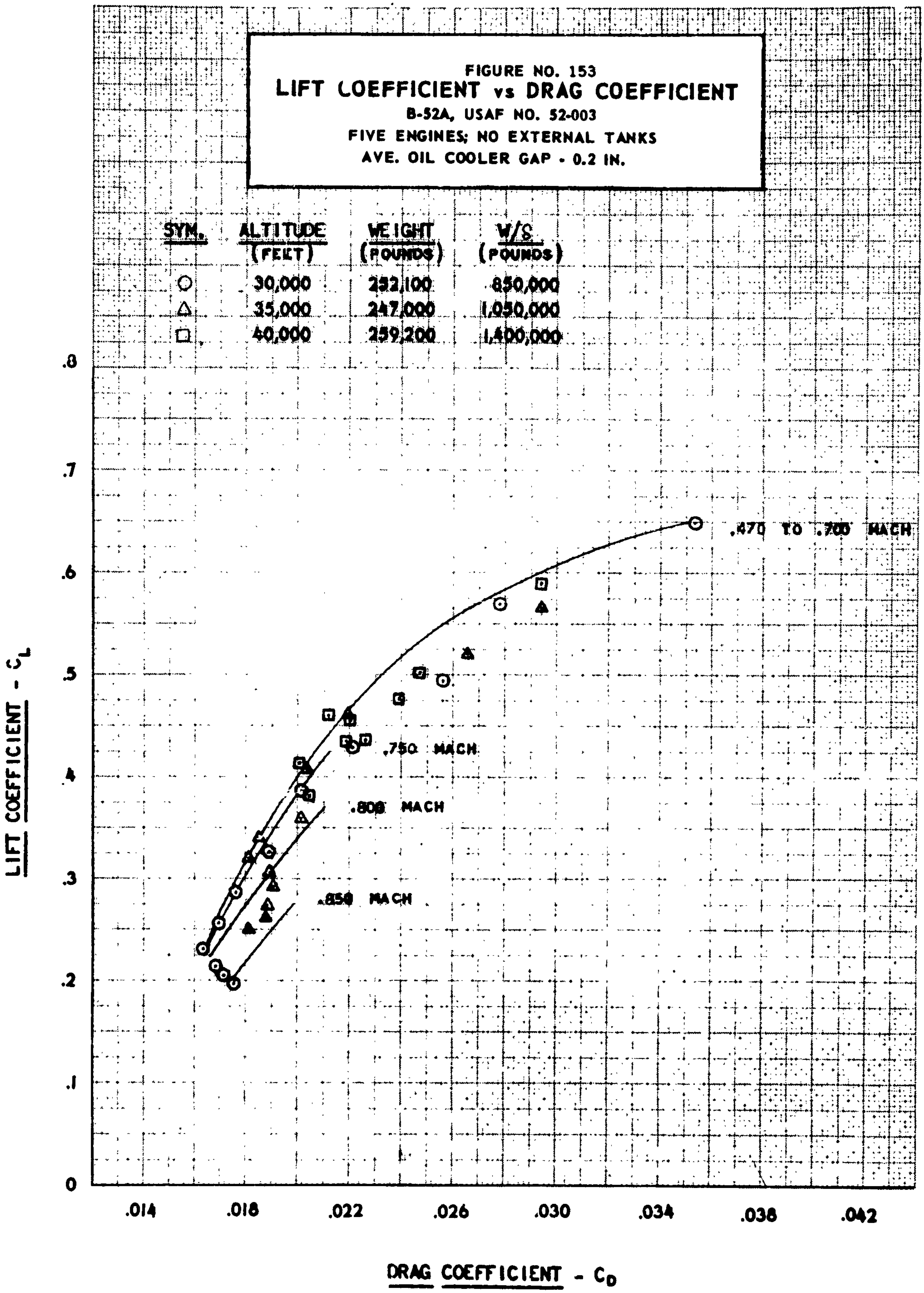


FIGURE NO. 153
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
FIVE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
○ 30,000 252,100 850,000
△ 35,000 247,000 1,050,000
□ 40,000 259,200 1,400,000
.470 TO .700 MACH
.750 MACH
.800 MACH
.850 MACH
LIFT COEFFICIENT - C_L
DRAG COEFFICIENT - C_D
0
.1
.2
.3
.4
.5
.6
.7
.8
.014
.018
.022
.026
.030
.034
.038
.042

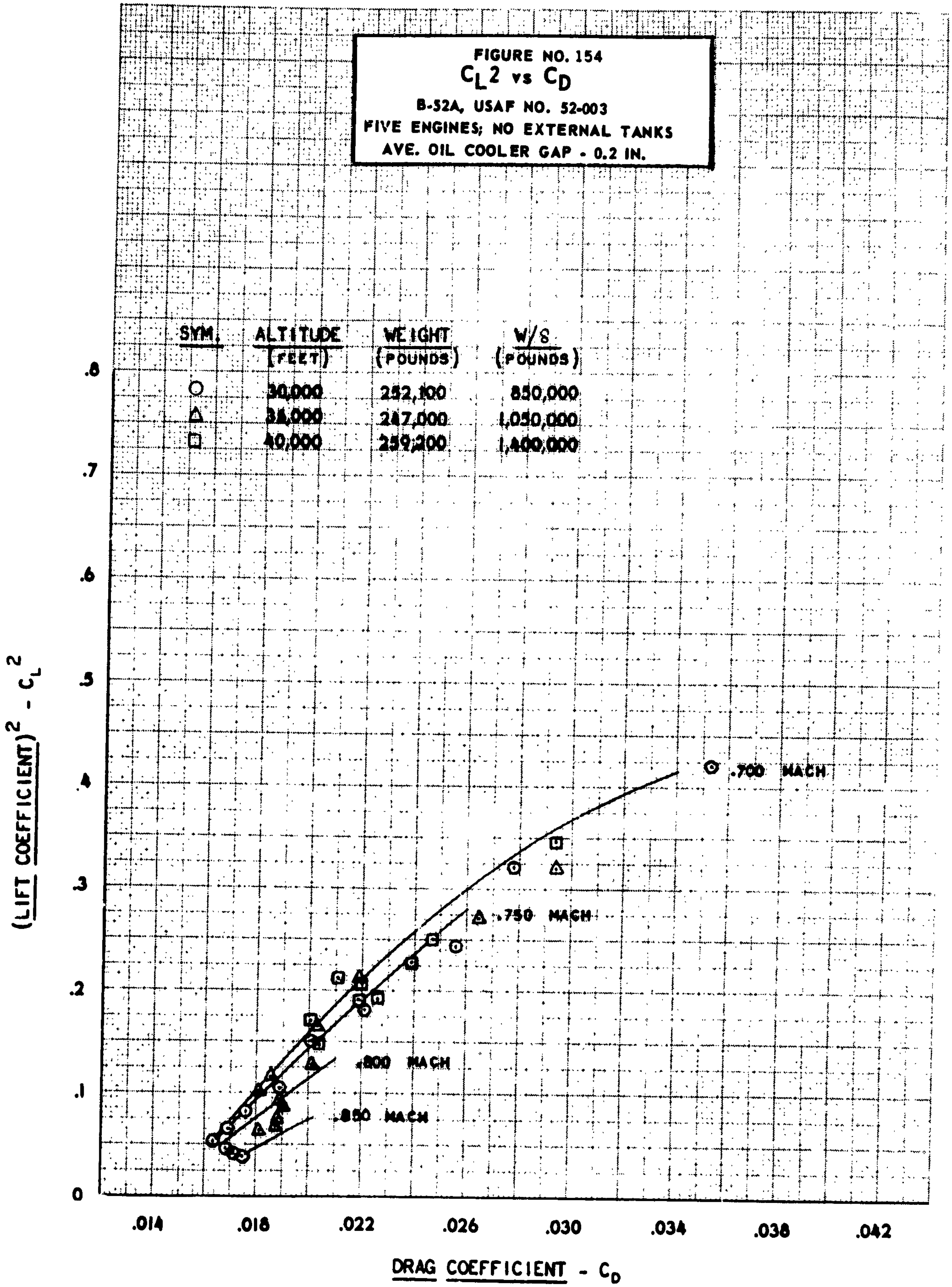


FIGURE NO. 154
$C_L{}^2$ vs C_D
B-52A, USAF NO. 52-003
FIVE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

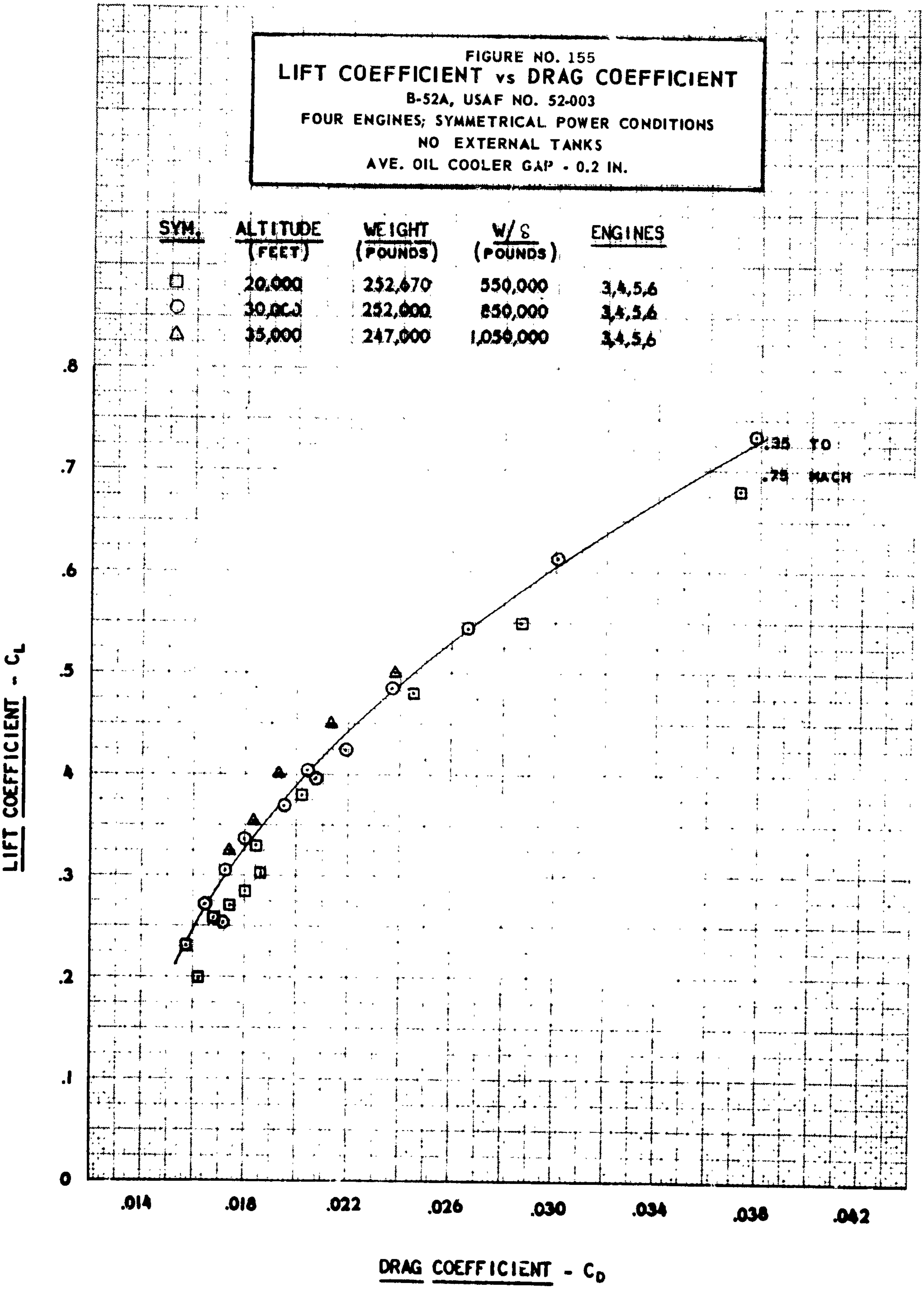


FIGURE NO. 155
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
FOUR ENGINES; SYMMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS) ENGINES
□ 20,000 252,670 550,000 3,4,5,6
○ 30,000 252,000 850,000 3,4,5,6
△ 35,000 247,000 1,050,000 3,4,5,6
.35 TO .75 MACH
LIFT COEFFICIENT - C_L
DRAG COEFFICIENT - C_D
0
.1
.2
.3
.4
.5
.6
.7
.8
.014
.018
.022
.026
.030
.034
.038
.042

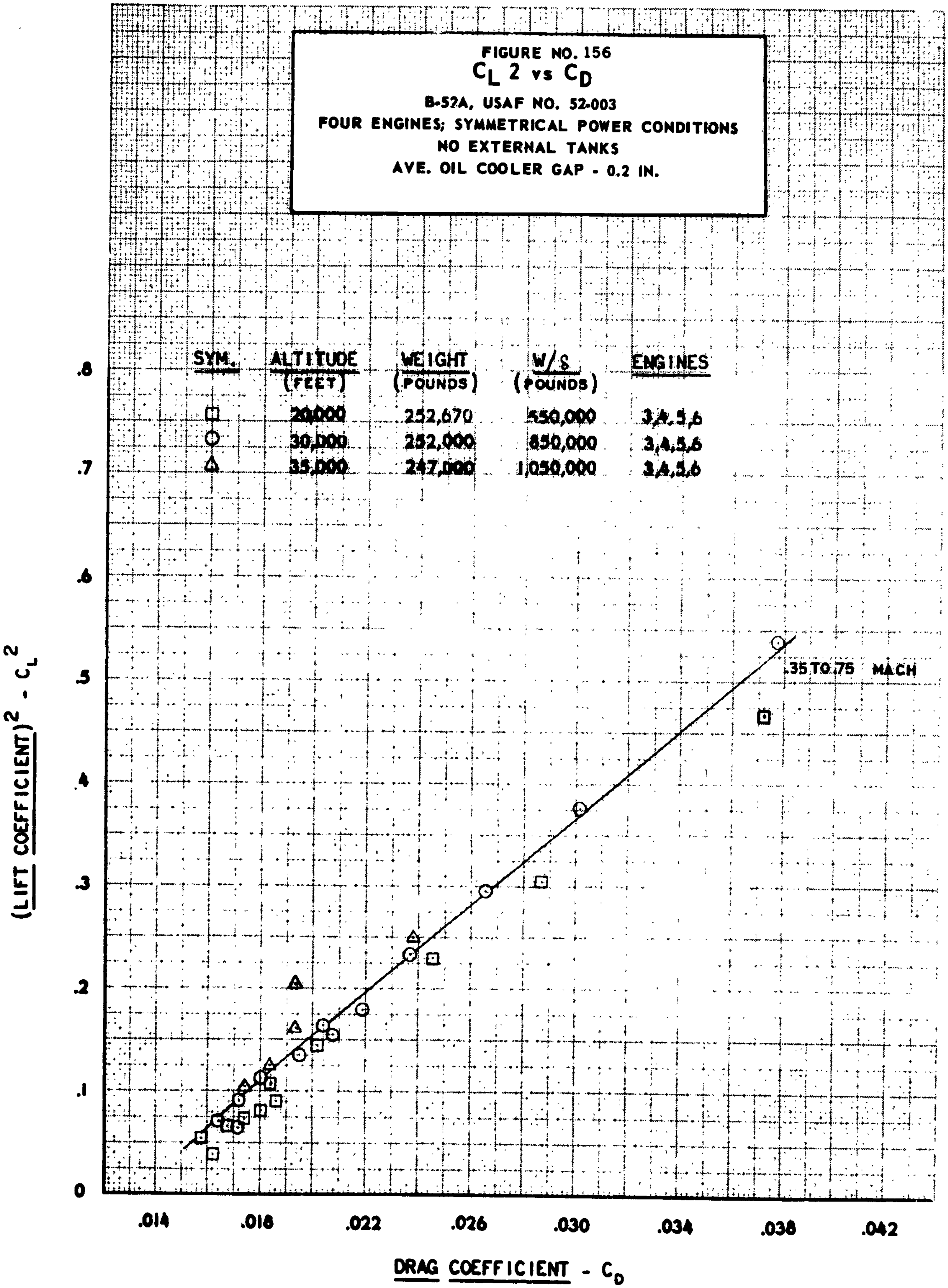


FIGURE NO. 156
$C_L{}^2$ vs C_D
B-52A, USAF NO. 52-003
FOUR ENGINES; SYMMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM. | ALTITUDE (FEET) | WEIGHT (POUNDS) | W/S (POUNDS) | ENGINES
□ | 20,000 | 252,670 | 550,000 | 3,4,5,6
○ | 30,000 | 252,000 | 850,000 | 3,4,5,6
△ | 35,000 | 247,000 | 1,050,000 | 3,4,5,6
.35 TO .75 MACH
(LIFT COEFFICIENT)^2 - $C_L{}^2$
DRAG COEFFICIENT - C_D
0
.1
.2
.3
.4
.5
.6
.7
.8
.014
.018
.022
.026
.030
.034
.038
.042

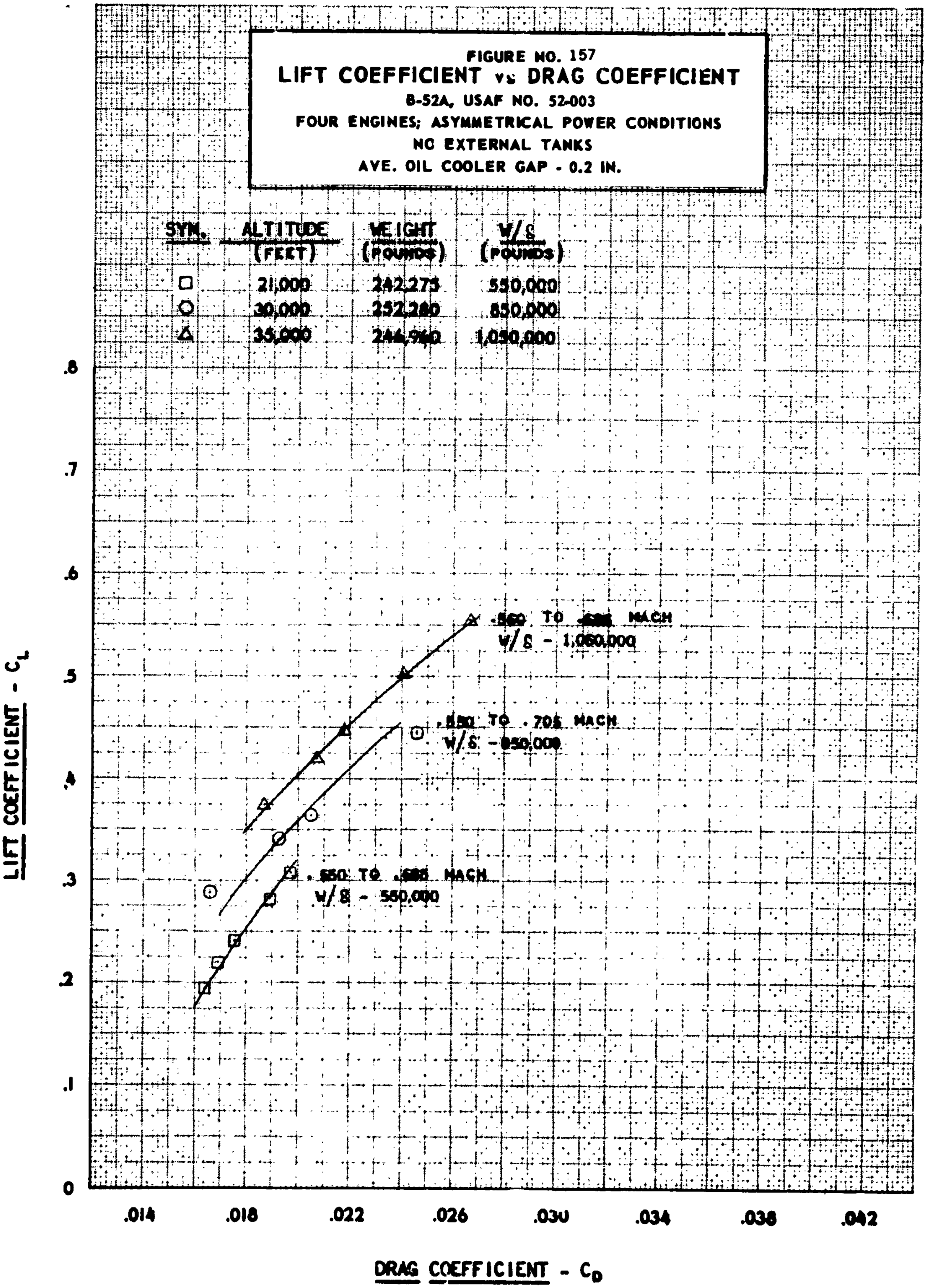


FIGURE NO. 157
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
FOUR ENGINES; ASYMMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
□ 21,000 242,275 550,000
○ 30,000 252,280 850,000
△ 35,000 246,960 1,050,000
.560 TO .686 MACH W/δ - 1,050,000
.650 TO .705 MACH W/δ - 850,000
.650 TO .686 MACH W/δ - 550,000
LIFT COEFFICIENT - C_L
DRAG COEFFICIENT - C_D
0
.1
.2
.3
.4
.5
.6
.7
.8
.014
.018
.022
.026
.030
.034
.038
.042

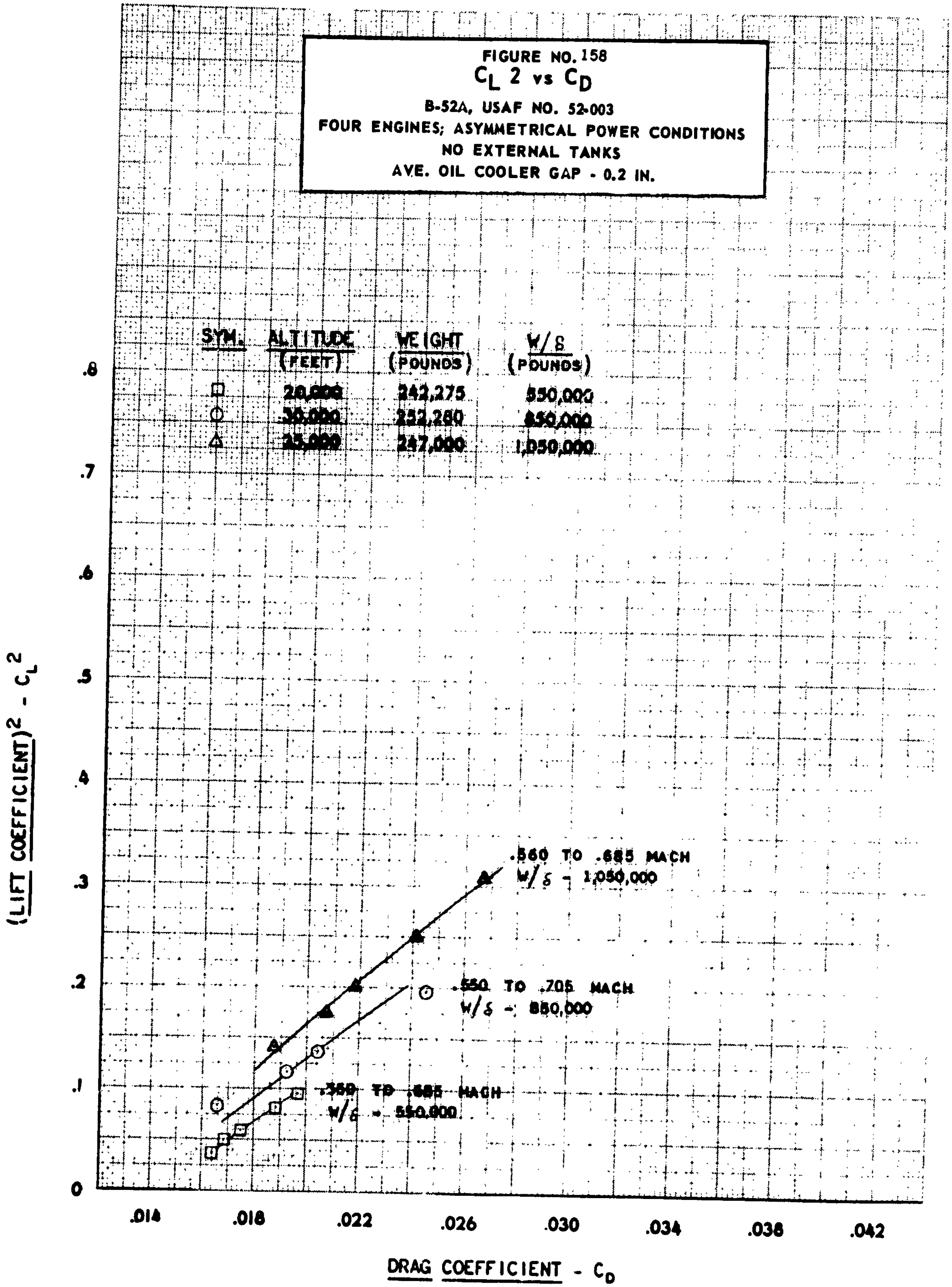


FIGURE NO. 158
C_L 2 vs C_D
B-52A, USAF NO. 52-003
FOUR ENGINES; ASYMMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
□ 20,000 242,275 550,000
○ 30,000 252,280 850,000
△ 35,000 247,000 1,050,000
.560 TO .685 MACH
W/δ - 1,050,000
.550 TO .705 MACH
W/δ - 850,000
.560 TO .685 MACH
W/δ - 550,000
(LIFT COEFFICIENT)^2 - C_L^2
0
.1
.2
.3
.4
.5
.6
.7
.8
.014
.018
.022
.026
.030
.034
.038
.042
DRAG COEFFICIENT - C_D

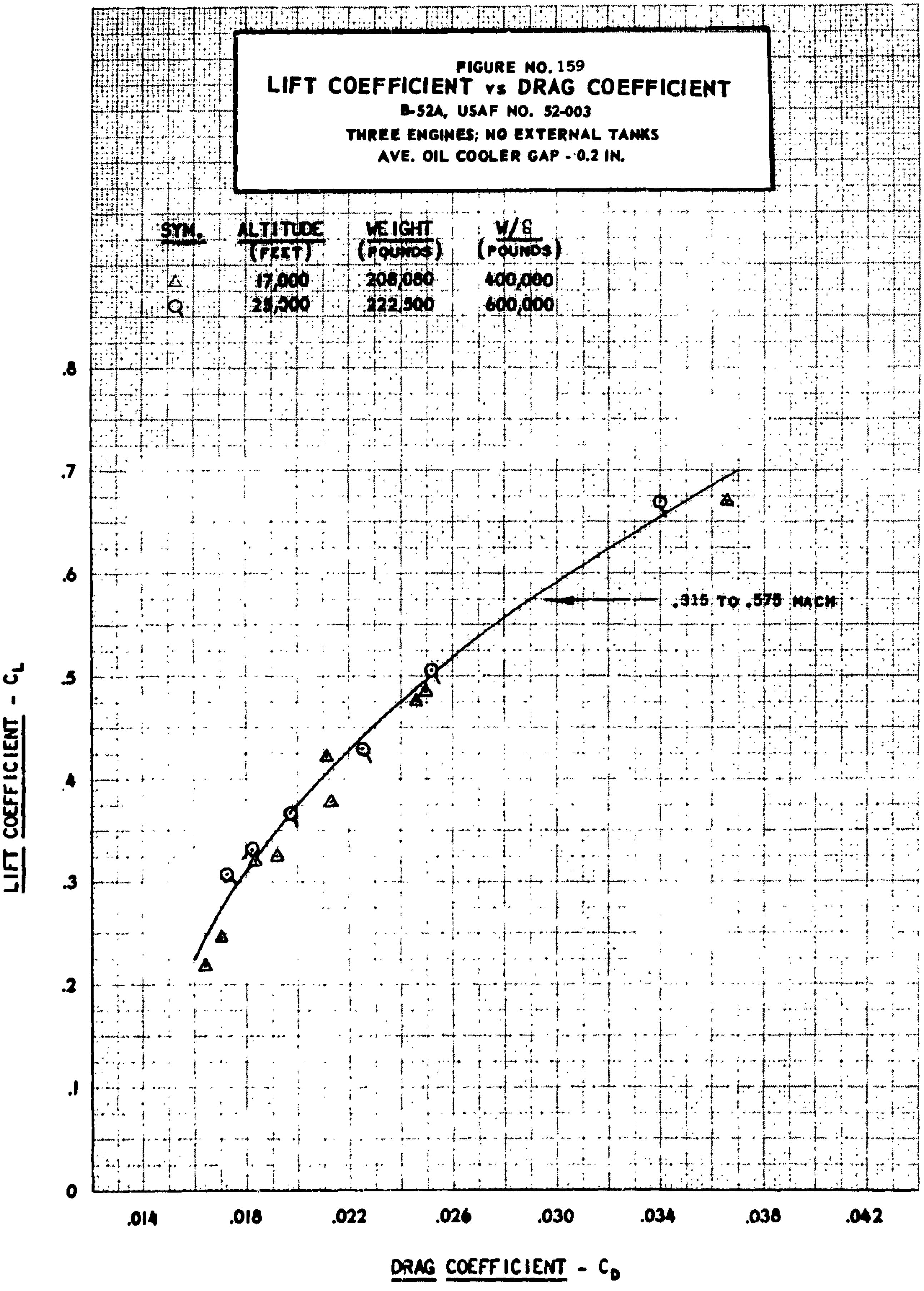


FIGURE NO. 159
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
THREE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
17,000
208,080
400,000
25,500
222,500
600,000
.315 TO .575 MACH
LIFT COEFFICIENT - C_L
DRAG COEFFICIENT - C_D
0
.1
.2
.3
.4
.5
.6
.7
.8
.014
.018
.022
.026
.030
.034
.038
.042

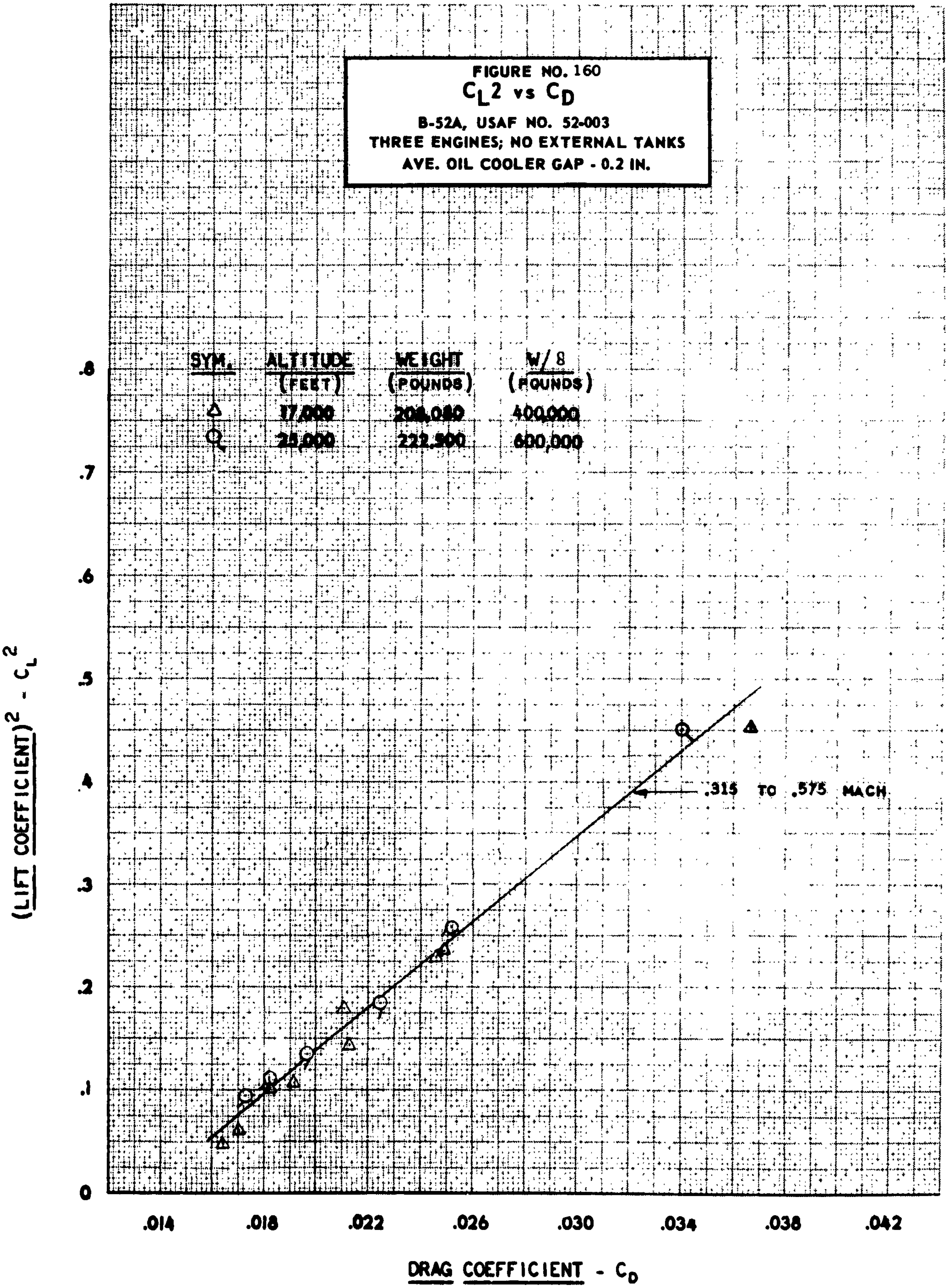


FIGURE NO. 160
$C_L 2$ vs C_D
B-52A, USAF NO. 52-003
THREE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
17,000 208,080 400,000
25,000 222,500 600,000
.315 TO .575 MACH
(LIFT COEFFICIENT)^2 - C_L^2
DRAG COEFFICIENT - C_D
0
.1
.2
.3
.4
.5
.6
.7
.8
.014
.018
.022
.026
.030
.034
.038
.042

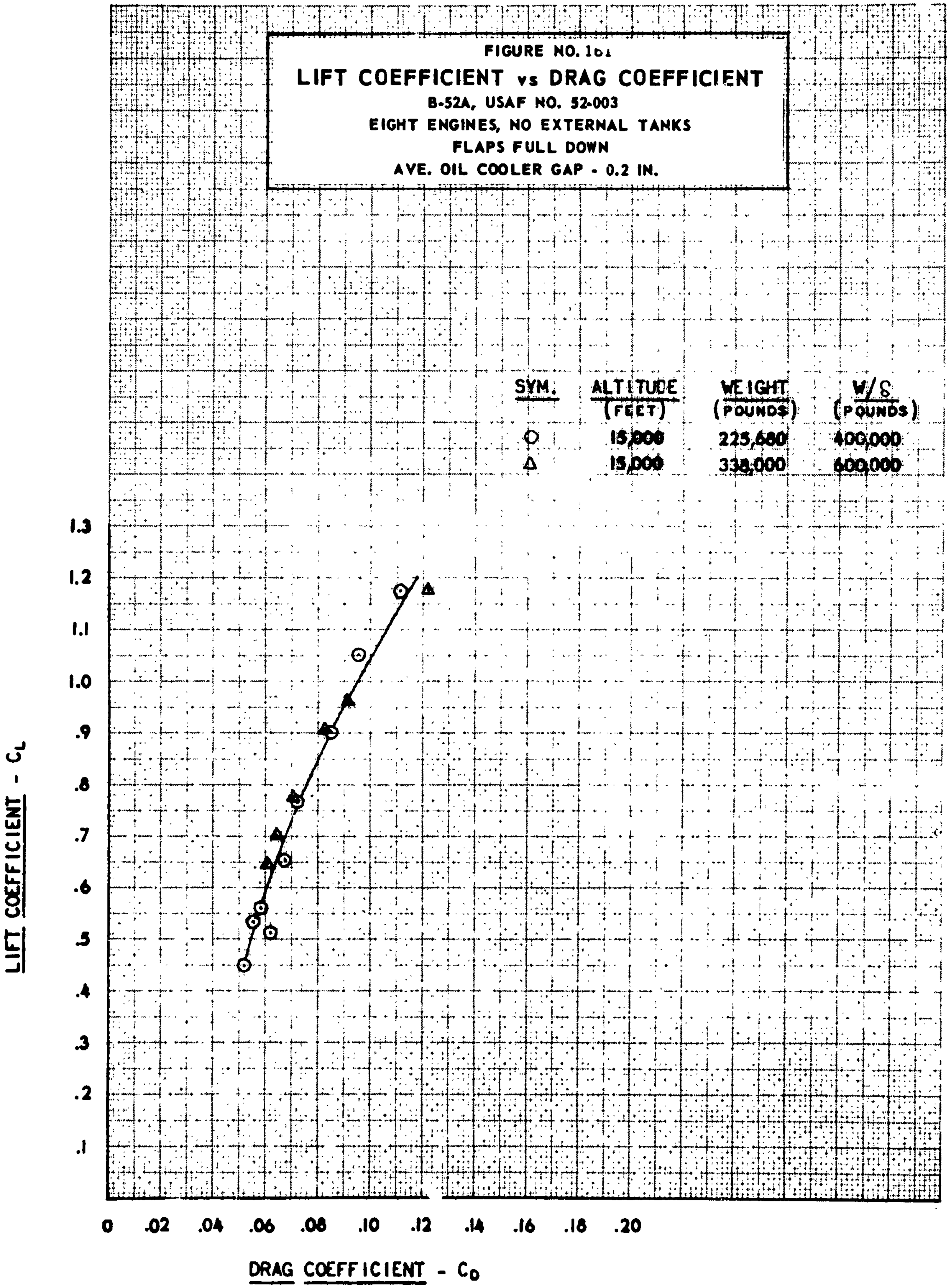


FIGURE NO. 161
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS FULL DOWN
AVE. OIL COOLER GAP - 0.2 IN.

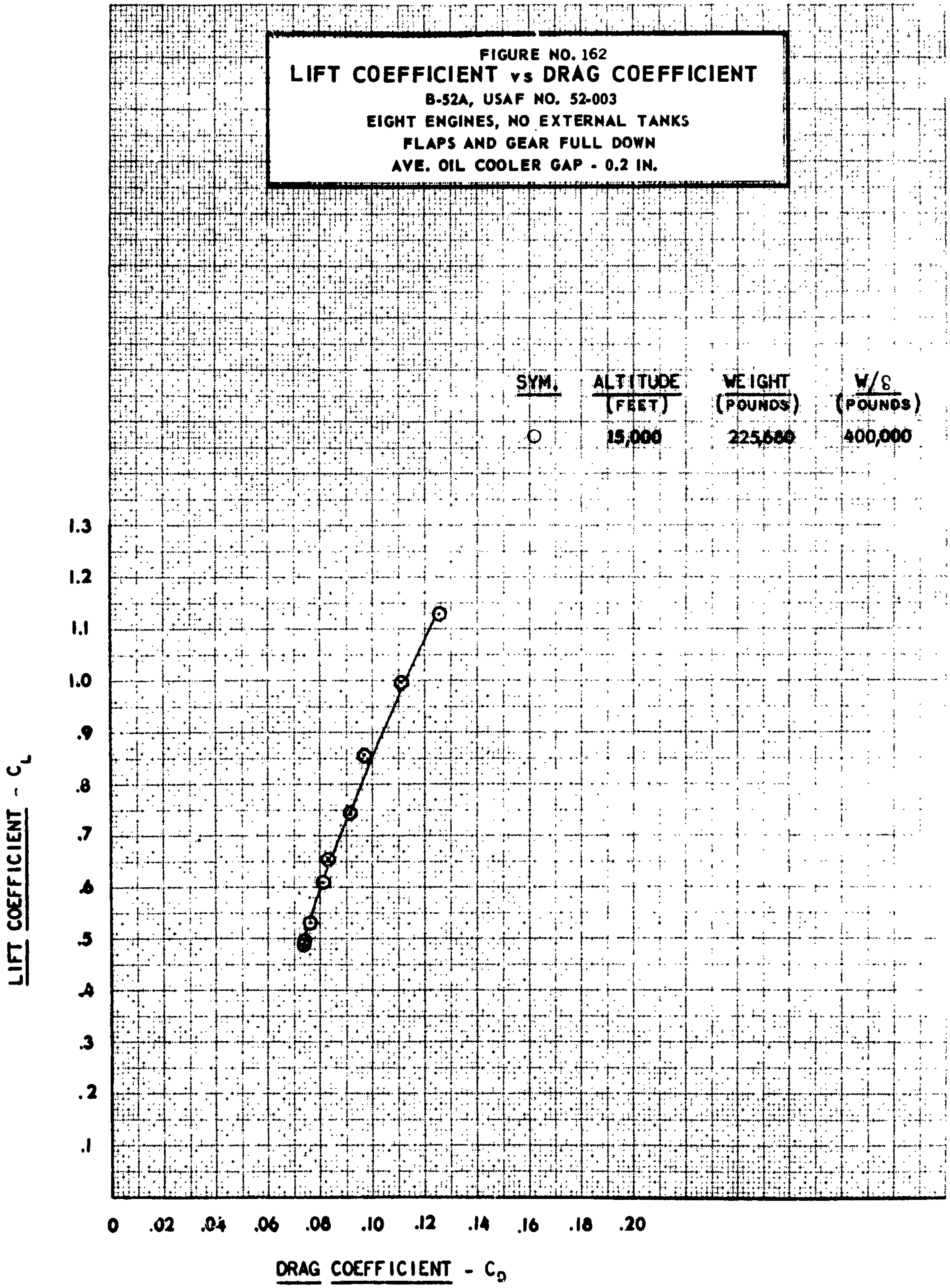
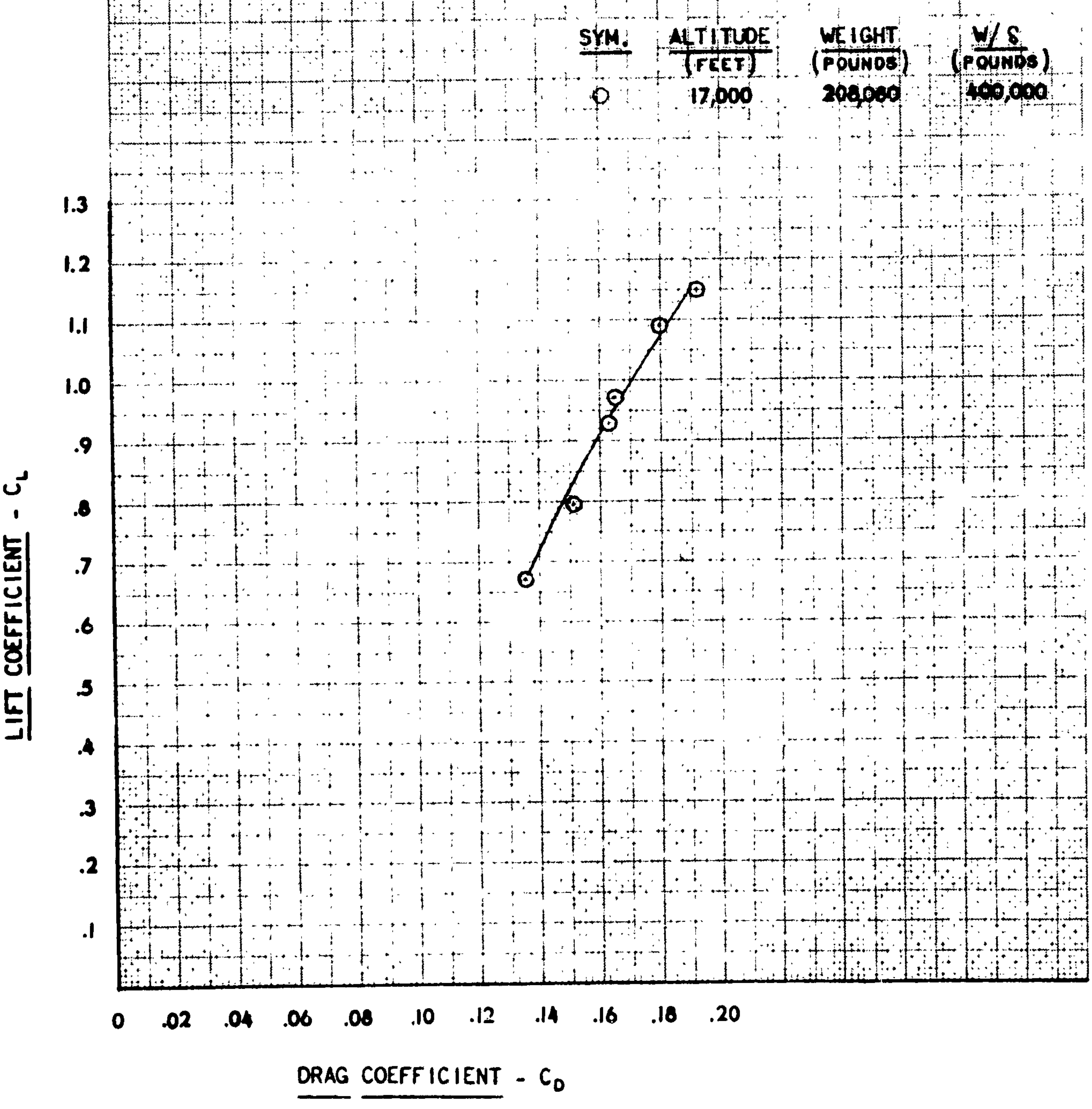


FIGURE NO. 162
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS AND GEAR FULL DOWN
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
15,000
225,680
400,000
1.3
1.2
1.1
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
LIFT COEFFICIENT - C_L
0
.02
.04
.06
.08
.10
.12
.14
.16
.18
.20
DRAG COEFFICIENT - C_D

FIGURE NO. 163
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS AND GEAR FULL DOWN, AIR BRAKES FULL UP
AVE. OIL COOLER GAP - 0.2 IN.



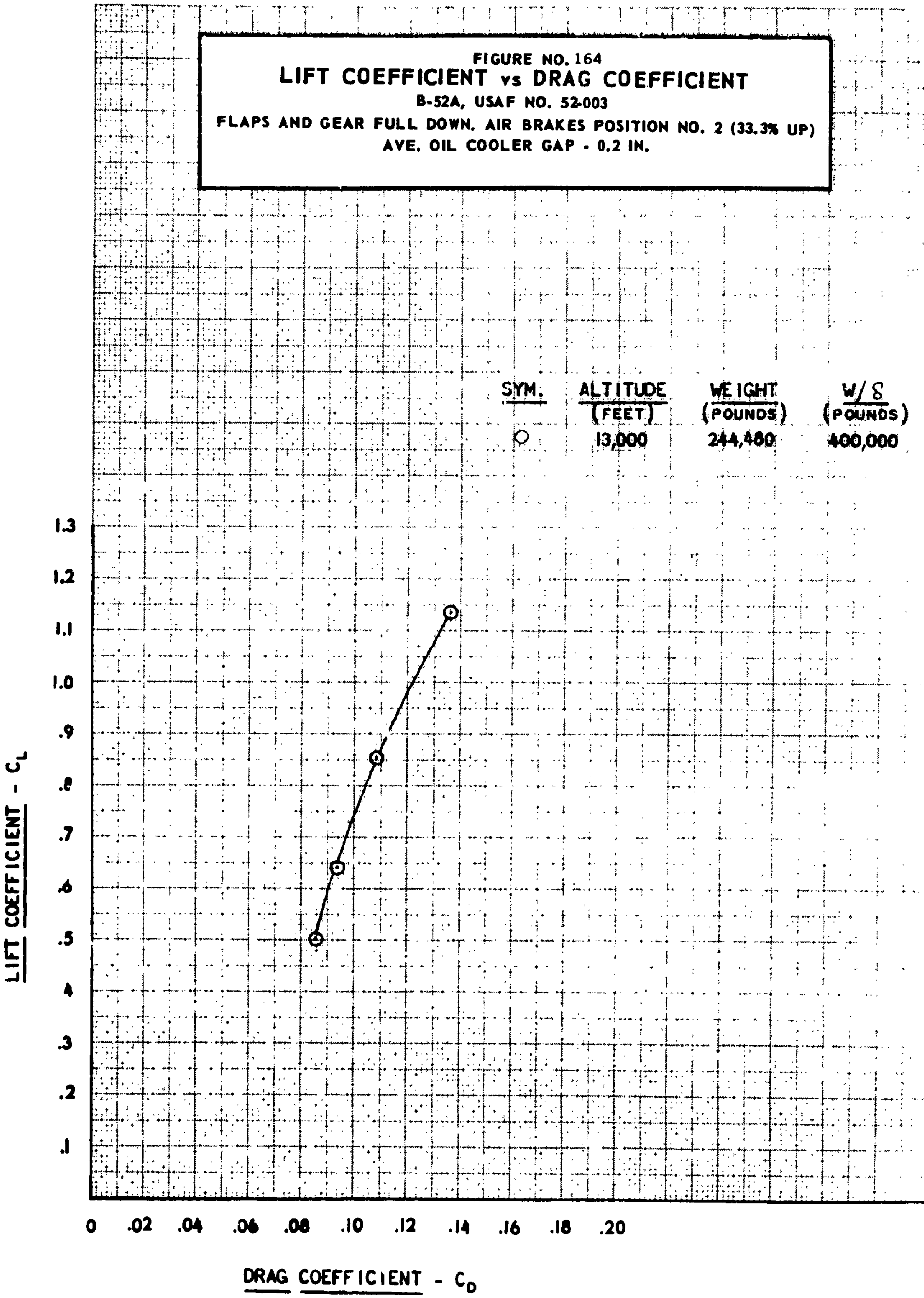


FIGURE NO. 164
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
FLAPS AND GEAR FULL DOWN, AIR BRAKES POSITION NO. 2 (33.3% UP)
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
13,000
244,480
400,000
LIFT COEFFICIENT - C_L
1.3
1.2
1.1
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
.02
.04
.06
.08
.10
.12
.14
.16
.18
.20
DRAG COEFFICIENT - C_D

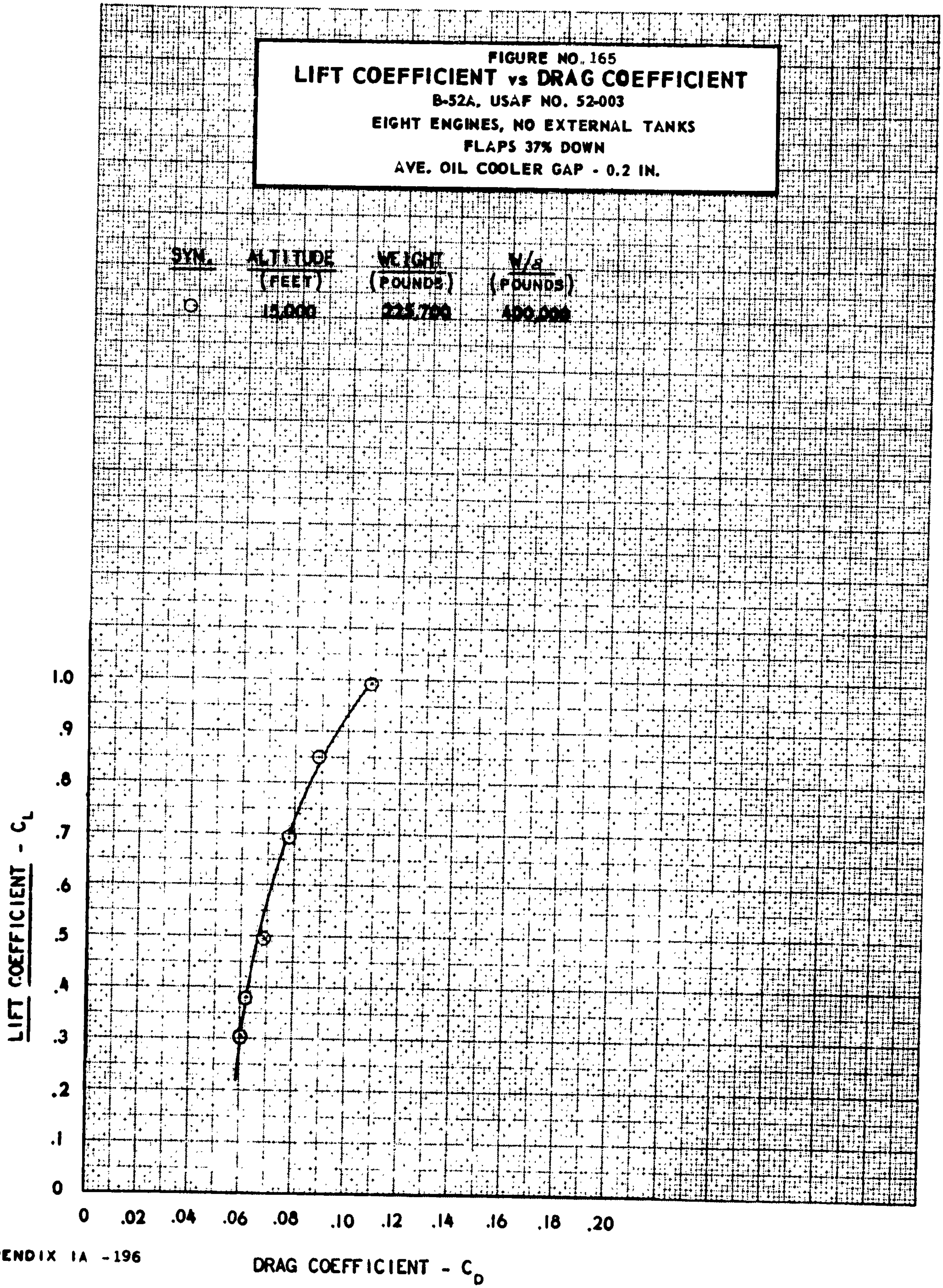


FIGURE NO. 165
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS 37% DOWN
AVE. OIL COOLER GAP - 0.2 IN.
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
○ 15,000 225,700 400,000
LIFT COEFFICIENT - C_L
0 .1 .2 .3 .4 .5 .6 .7 .8 .9 1.0
0 .02 .04 .06 .08 .10 .12 .14 .16 .18 .20
DRAG COEFFICIENT - C_D

FIGURE NO. 166
LIFT COEFFICIENT vs DRAG COEFFICIENT
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
GEAR DOWN, AIR BRAKES FULL UP
AVE. OIL COOLER GAP - 0.2 IN.

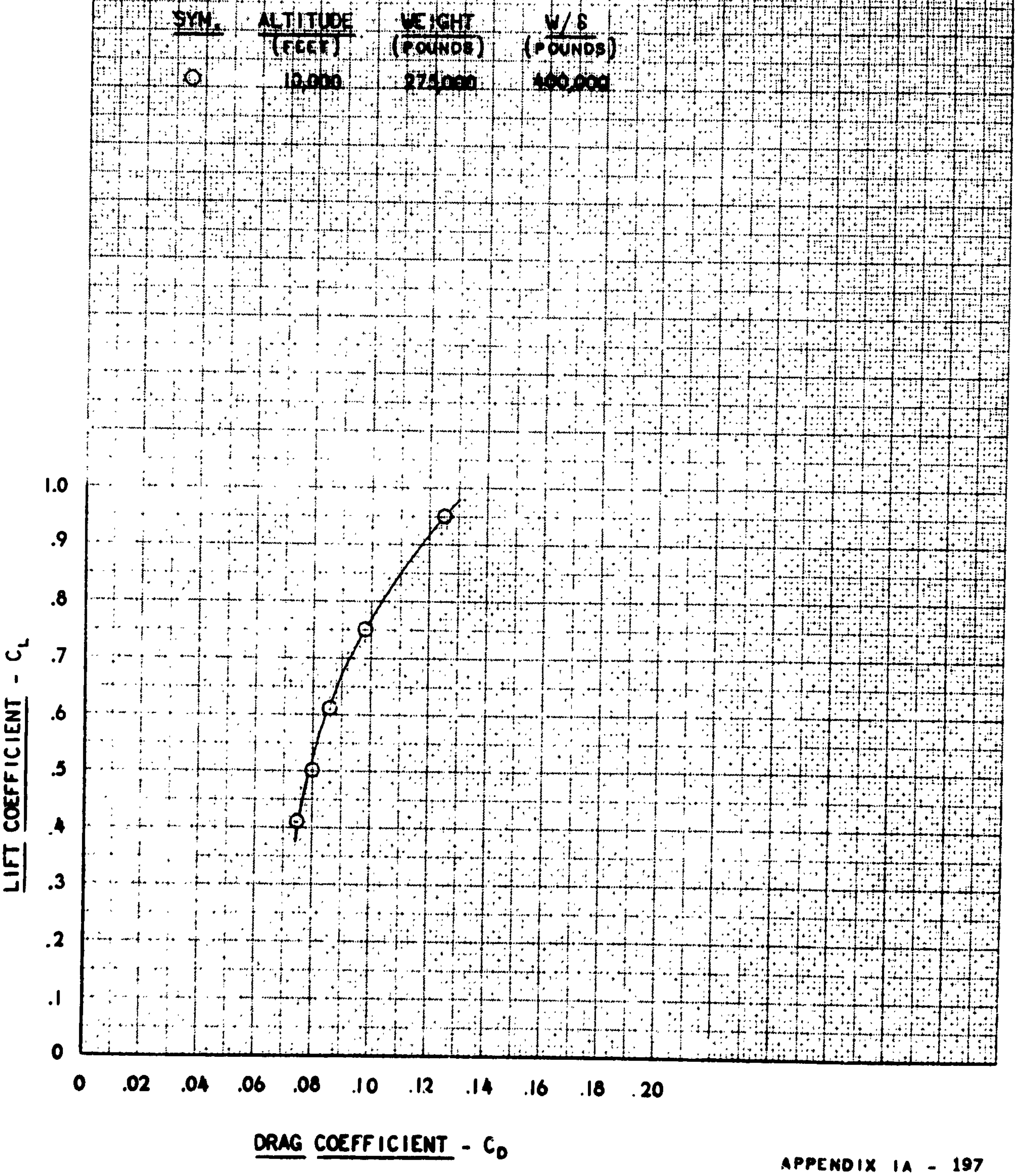


FIGURE NO. 167

AIRCRAFT DRAG COEFFICIENT

B-52A, USAF NO. 52-003

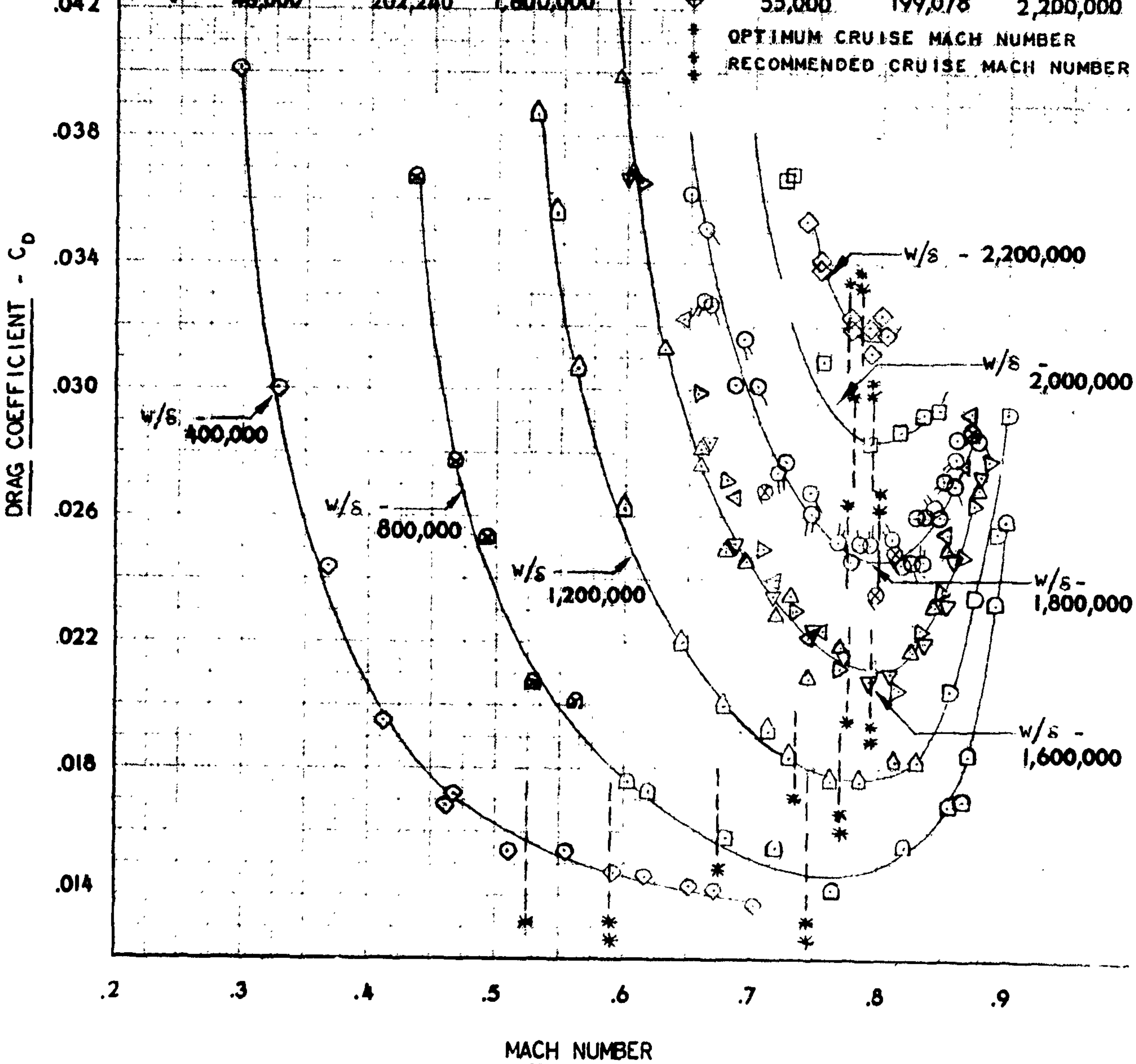
EIGHT ENGINES; NO EXTERNAL TANKS

AVE. OIL COOLER GAP - 0.2 IN.

SYM.	ALTITUDE (FEET)	WEIGHT (POUNDS)	W/δ (POUNDS)	SYM.	ALTITUDE (FEET)	WEIGHT (POUNDS)	W/δ (POUNDS)
	15,000	225,700	400,000		45,000	262,700	1,800,000
	30,000	237,300	800,000		40,000	333,360	1,800,000
	35,000	282,300	1,200,000		40,000	333,360	1,800,000
	40,000	296,320	1,600,000		50,000	206,820	1,800,000
	37,000	341,920	1,600,000		45,000	291,900	2,000,000
	45,000	233,000	1,600,000		52,000	229,680	2,200,000
	48,000	202,240	1,600,000		55,000	199,078	2,200,000

* OPTIMUM CRUISE MACH NUMBER

* RECOMMENDED CRUISE MACH NUMBER



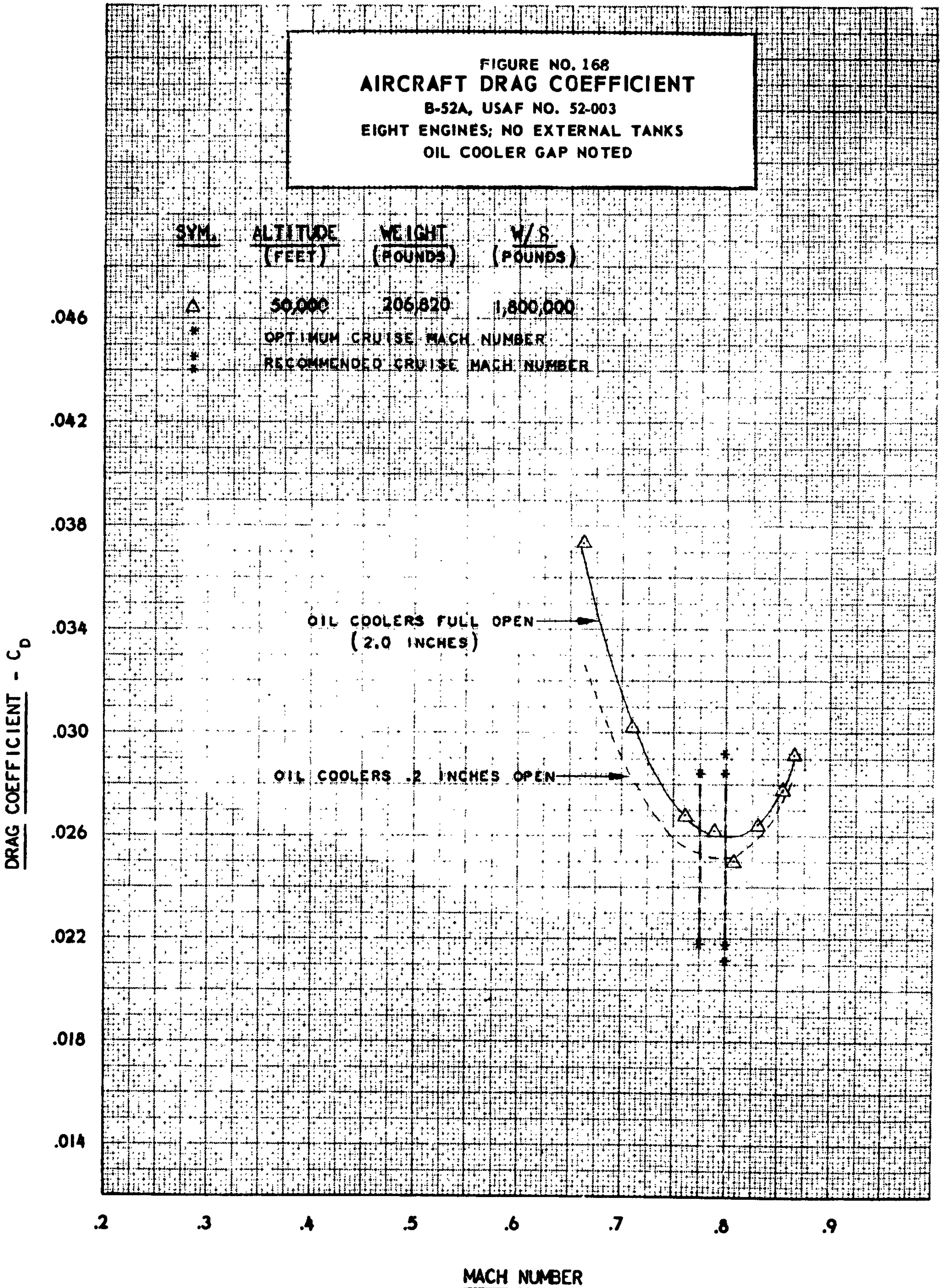


FIGURE NO. 168
AIRCRAFT DRAG COEFFICIENT
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
OIL COOLER GAP NOTED
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/S (POUNDS)
△ 50,000 206,820 1,800,000
* OPTIMUM CRUISE MACH NUMBER
** RECOMMENDED CRUISE MACH NUMBER
OIL COOLERS FULL OPEN (2.0 INCHES)
OIL COOLERS .2 INCHES OPEN
.046
.042
.038
.034
.030
.026
.022
.018
.014
DRAG COEFFICIENT - C_D
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

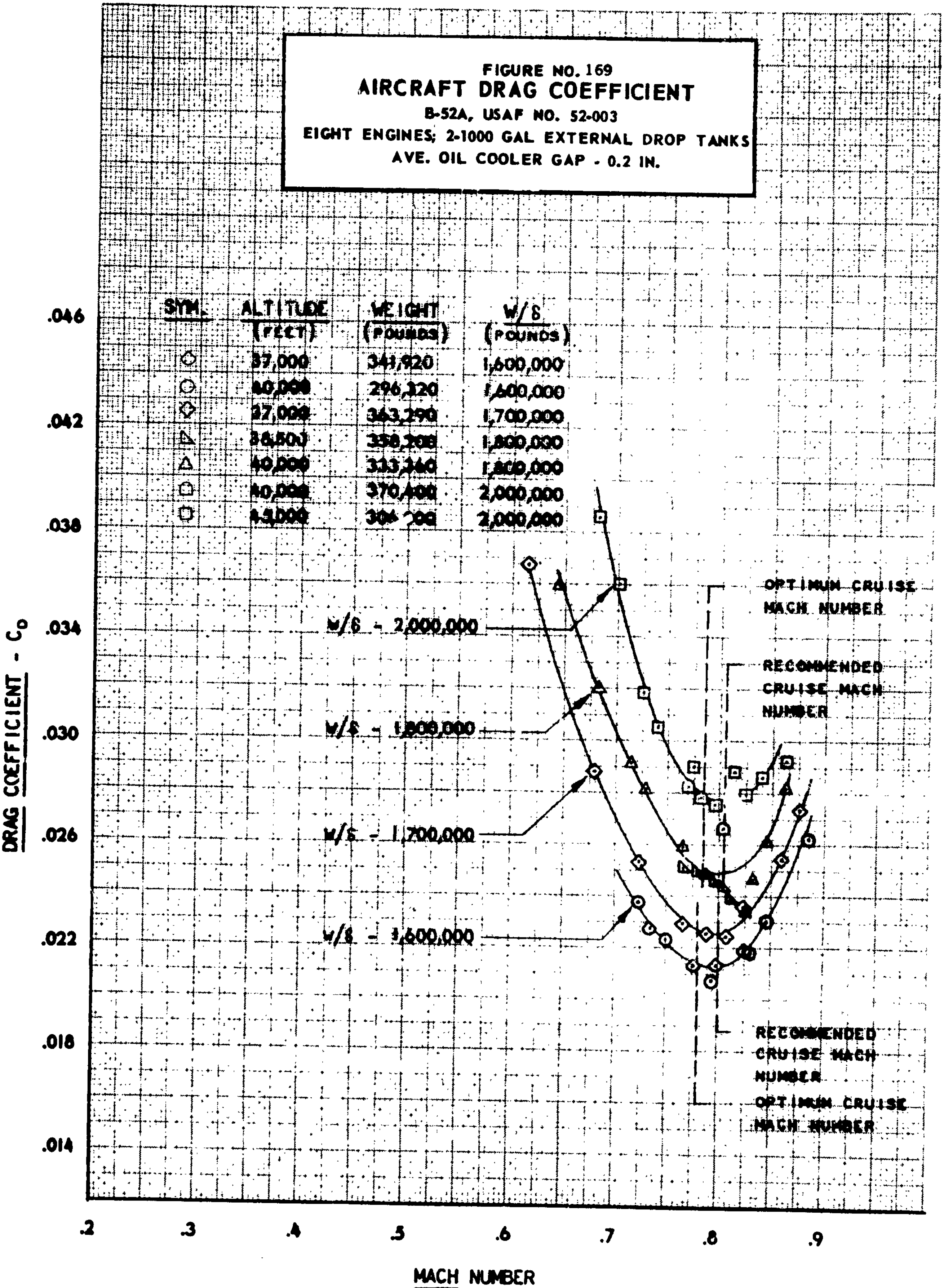


FIGURE NO. 169
AIRCRAFT DRAG COEFFICIENT
B-52A, USAF NO. 52-003
EIGHT ENGINES; 2-1000 GAL EXTERNAL DROP TANKS
AVE. OIL COOLER GAP - 0.2 IN.

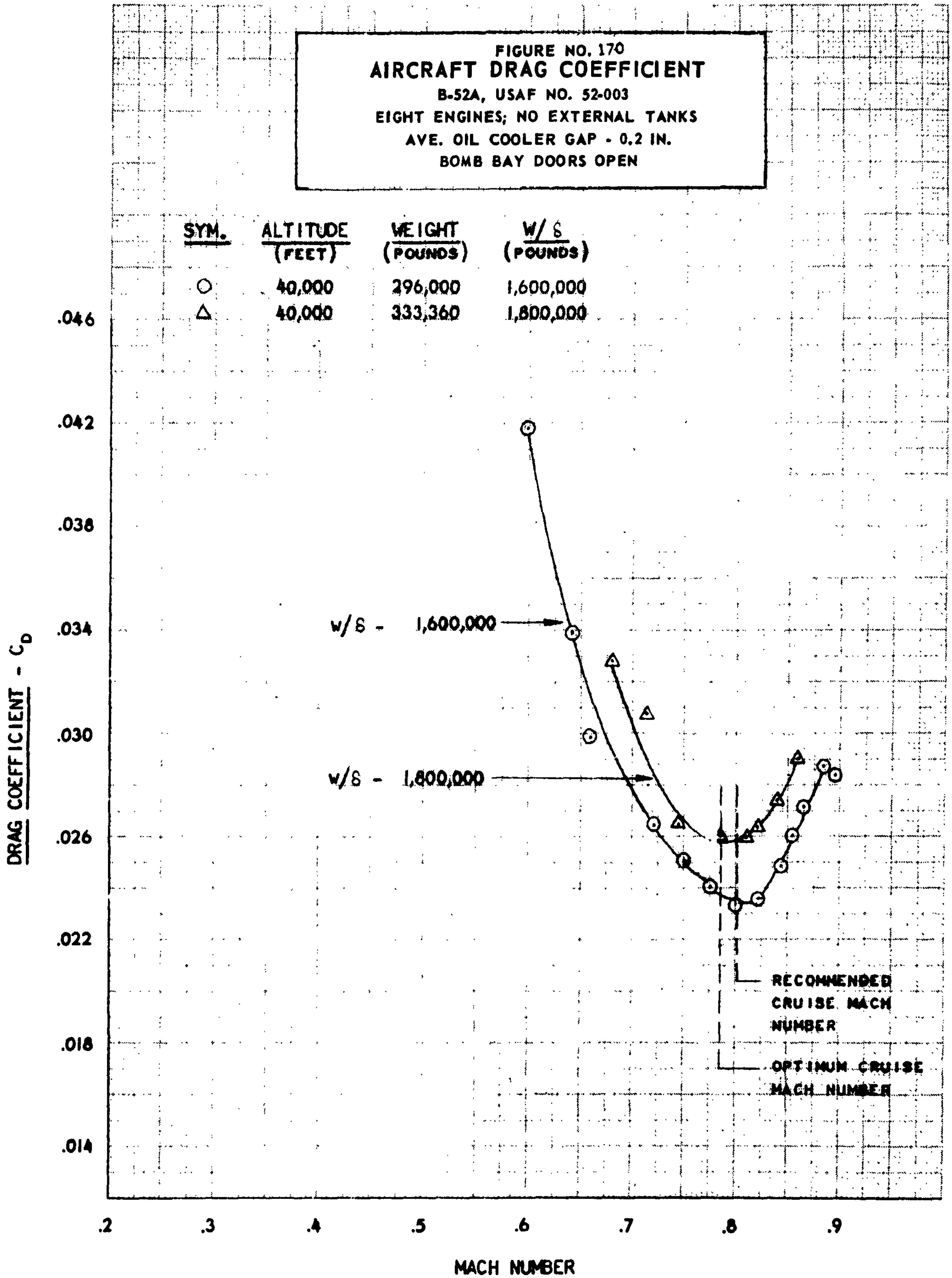


FIGURE NO. 170
AIRCRAFT DRAG COEFFICIENT
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
BOMB BAY DOORS OPEN
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/δ (POUNDS)
○ 40,000 296,000 1,600,000
△ 40,000 333,360 1,800,000
W/δ - 1,600,000
W/δ - 1,800,000
RECOMMENDED CRUISE MACH NUMBER
OPTIMUM CRUISE MACH NUMBER
DRAG COEFFICIENT - C_D
.046
.042
.038
.034
.030
.026
.022
.018
.014
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

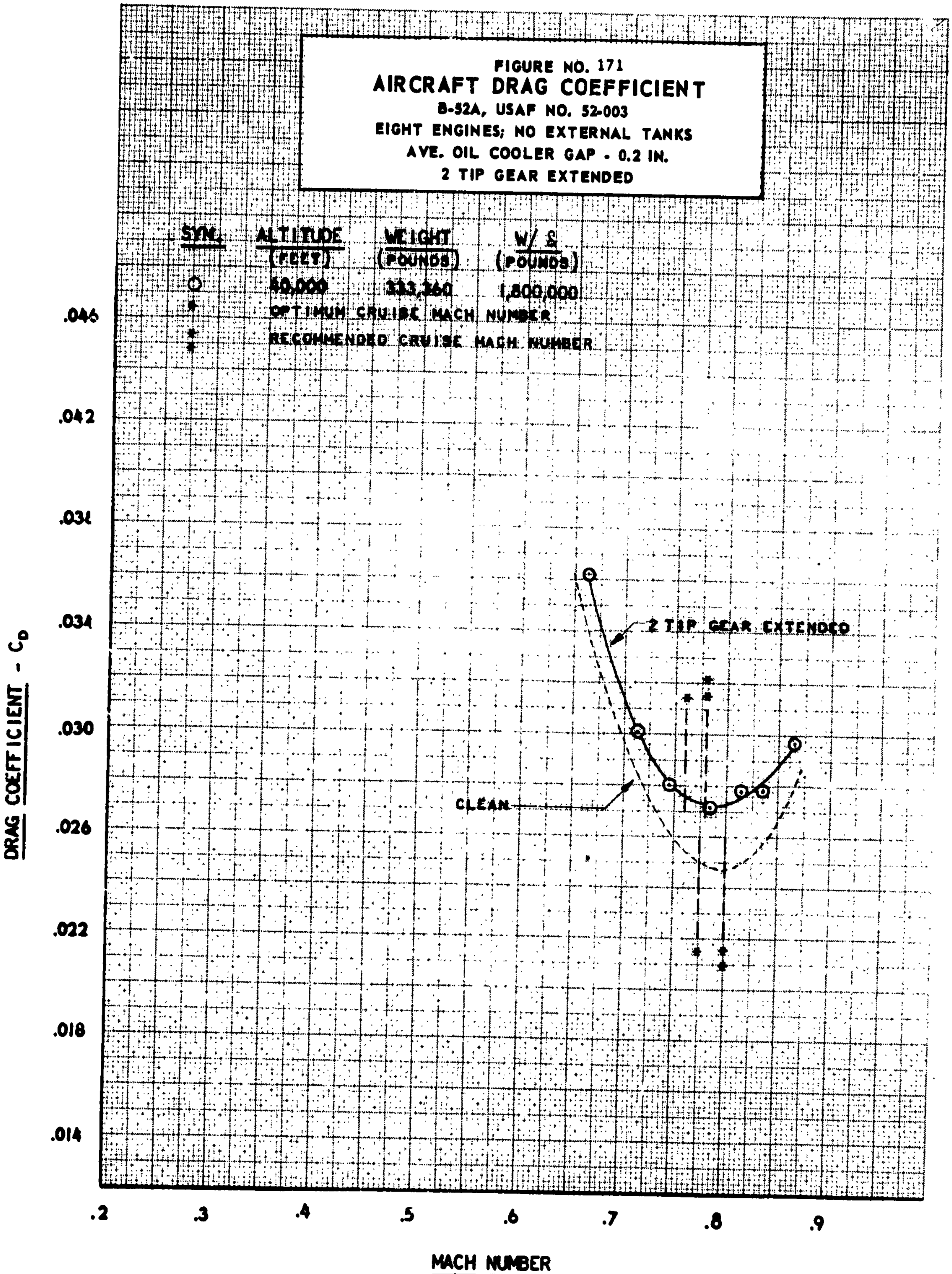


FIGURE NO. 171
AIRCRAFT DRAG COEFFICIENT
B-52A, USAF NO. 52-003
EIGHT ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
2 TIP GEAR EXTENDED
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
40,000
333,360
1,800,000
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
2 TIP GEAR EXTENDED
CLEAN
.046
.042
.030
.026
.022
.018
.014
.2
.3
.4
.5
.6
.7
.8
.9
DRAG COEFFICIENT - C_D
MACH NUMBER

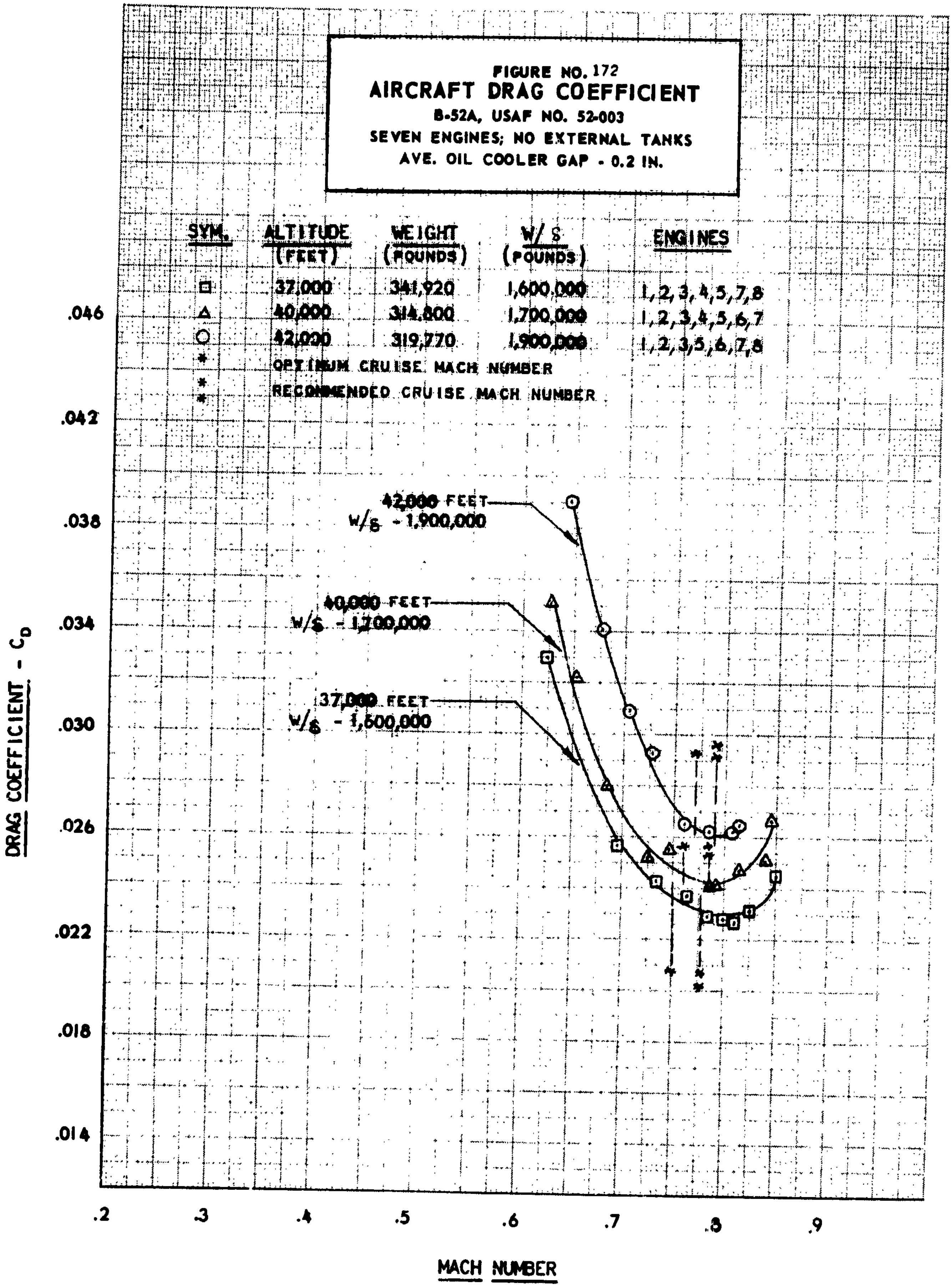
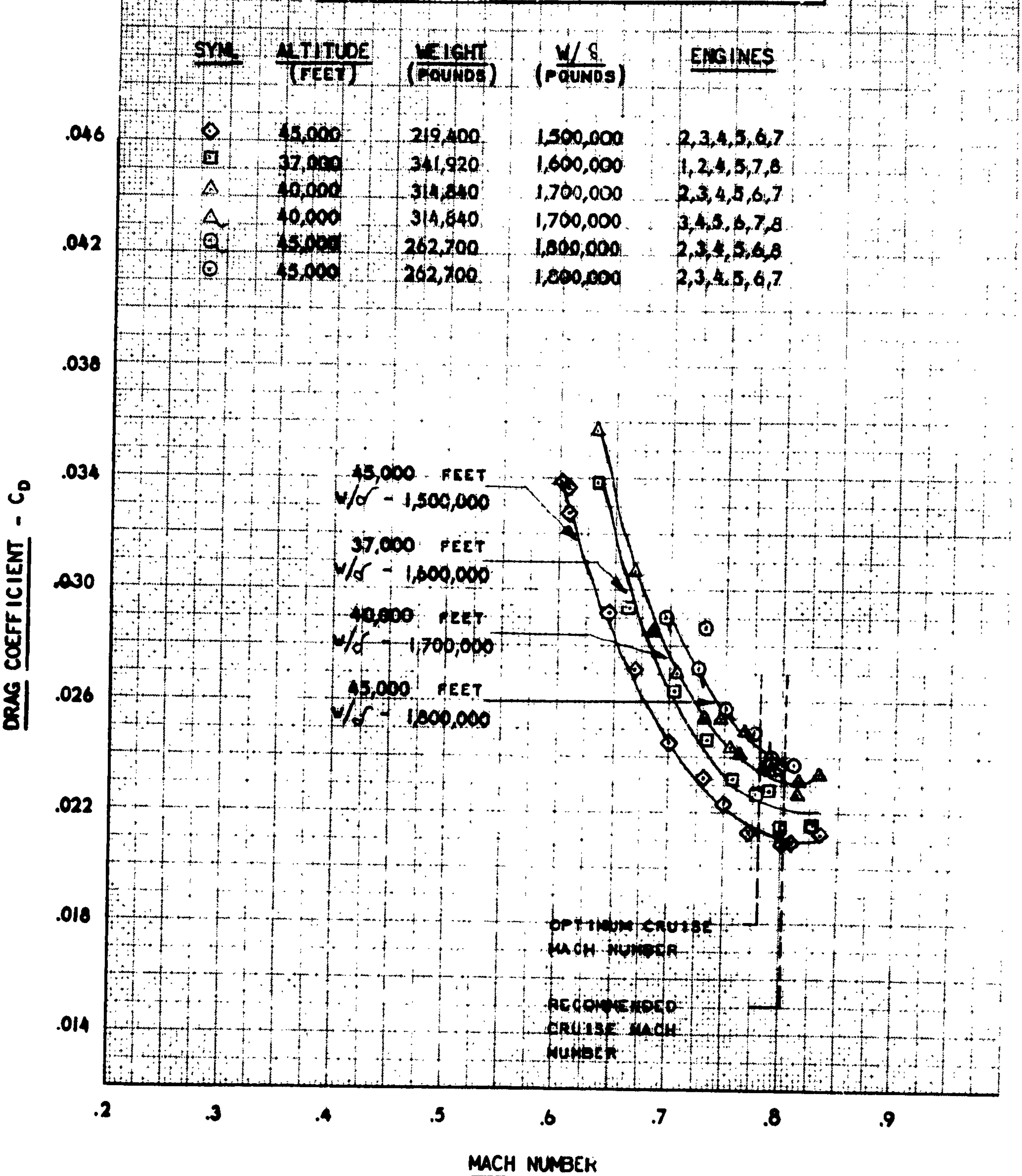


FIGURE NO. 172
AIRCRAFT DRAG COEFFICIENT
B-52A, USAF NO. 52-003
SEVEN ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/S (POUNDS)
ENGINES
37,000
341,920
1,600,000
1,2,3,4,5,7,8
40,000
314,800
1,700,000
1,2,3,4,5,6,7
42,000
319,770
1,900,000
1,2,3,5,6,7,8
OPTIMUM CRUISE MACH NUMBER
RECOMMENDED CRUISE MACH NUMBER
42,000 FEET
W/S - 1,900,000
40,000 FEET
W/S - 1,700,000
37,000 FEET
W/S - 1,600,000
DRAG COEFFICIENT - C_D
.046
.042
.038
.034
.030
.026
.022
.018
.014
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

FIGURE NO. 173
AIRCRAFT DRAG COEFFICIENT
B-52A, USAF NO. 52-003
SIX ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.



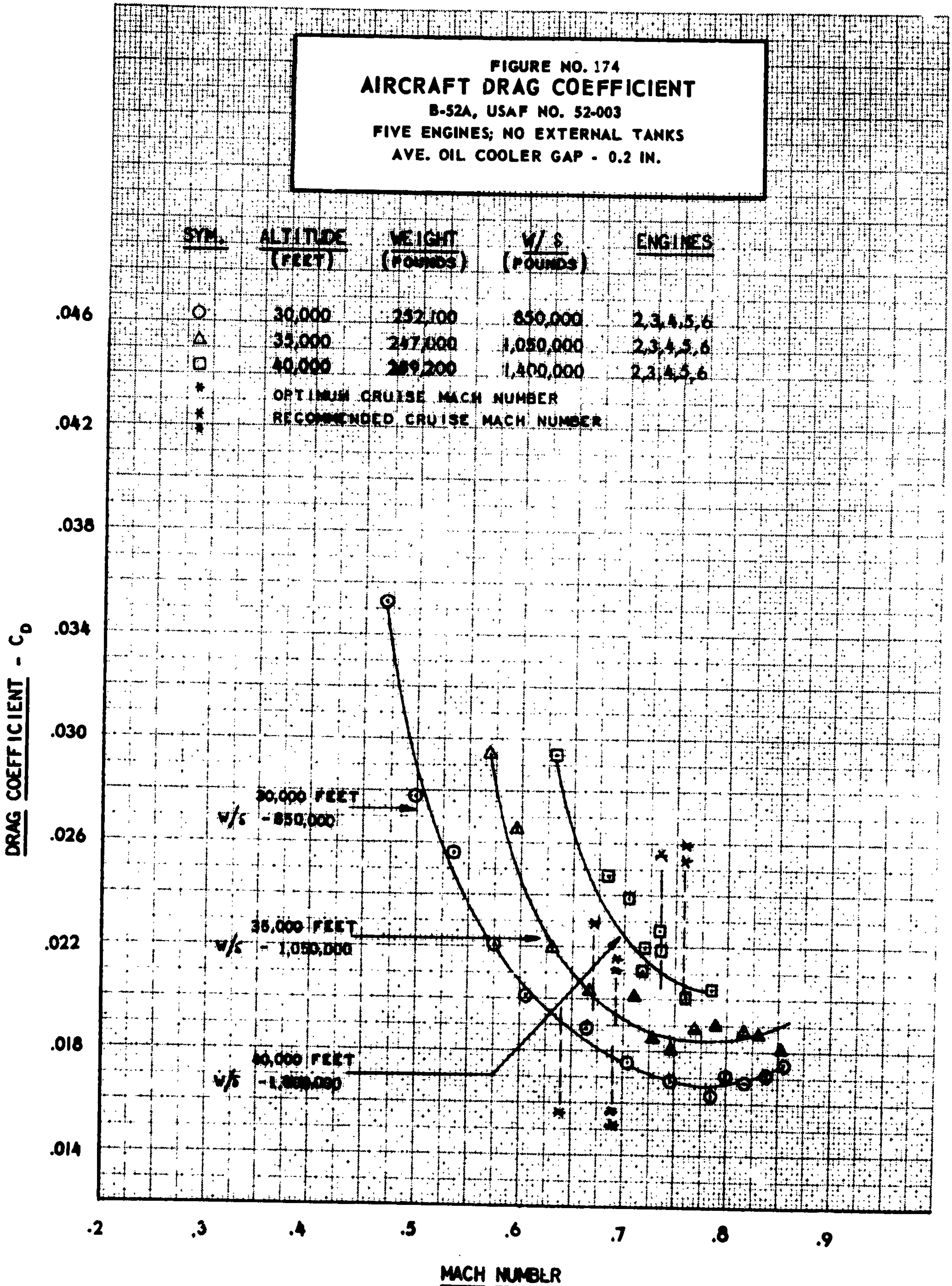


FIGURE NO. 174
AIRCRAFT DRAG COEFFICIENT
B-52A, USAF NO. 52-003
FIVE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

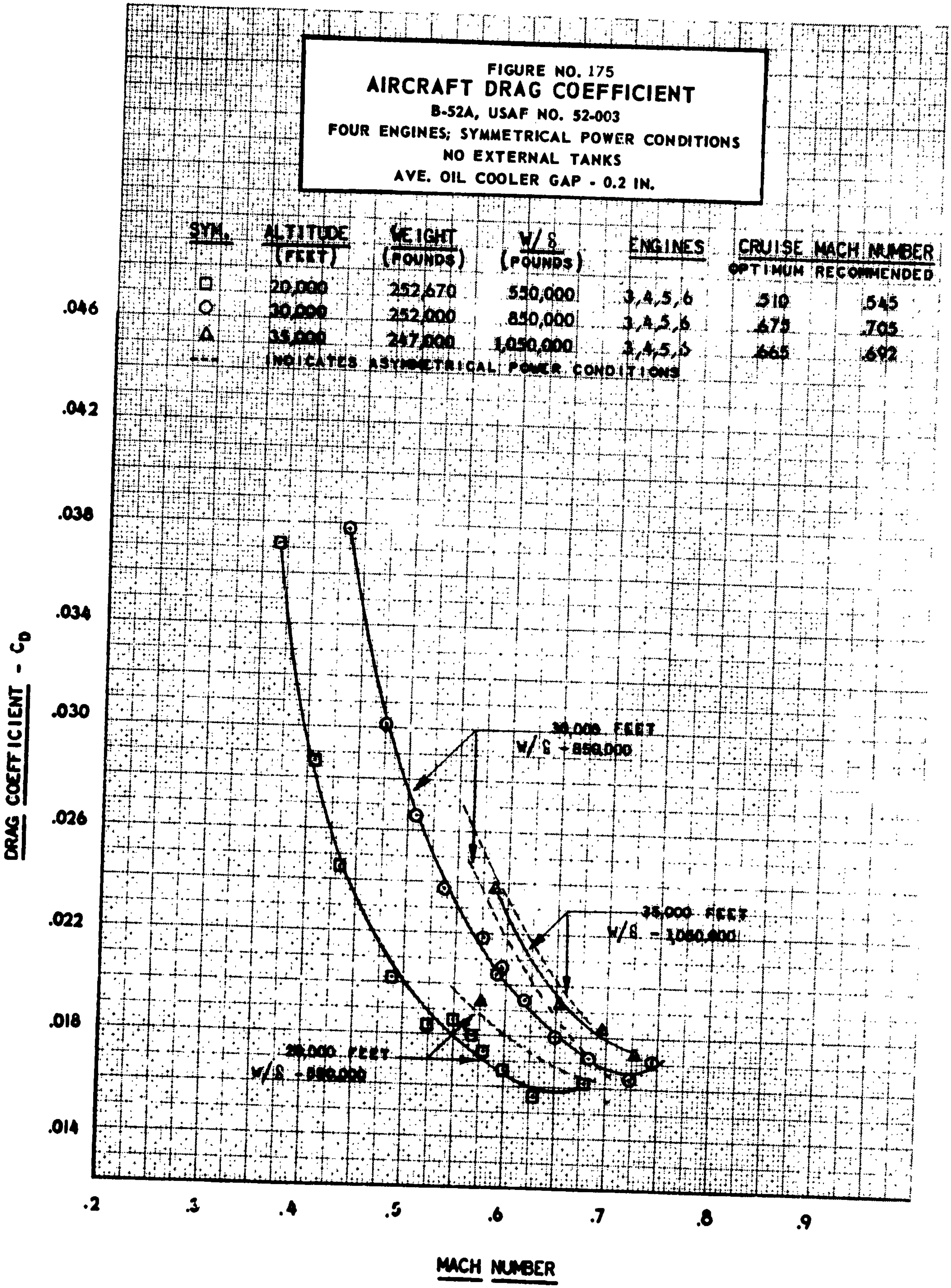
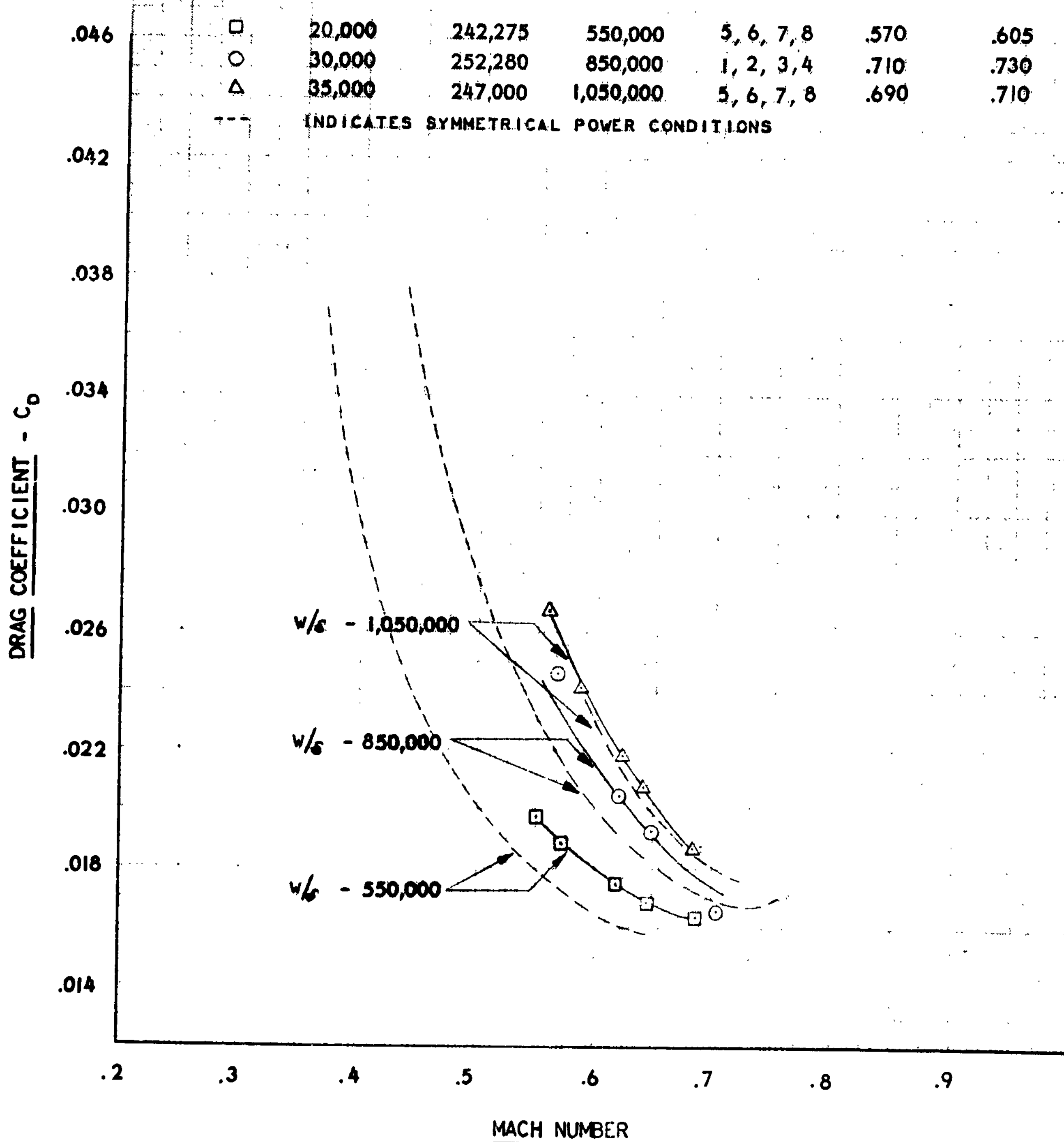


FIGURE NO. 175
AIRCRAFT DRAG COEFFICIENT
B-52A, USAF NO. 52-003
FOUR ENGINES; SYMMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM. ALTITUDE (FEET) WEIGHT (POUNDS) W/S (POUNDS) ENGINES CRUISE MACH NUMBER OPTIMUM RECOMMENDED
□ 20,000 252,670 550,000 3,4,5,6 .510 .545
○ 30,000 252,000 850,000 3,4,5,6 .675 .705
△ 35,000 247,000 1,050,000 3,4,5,6 .665 .692
--- INDICATES ASYMMETRICAL POWER CONDITIONS
30,000 FEET W/S - 850,000
35,000 FEET W/S - 1,050,000
20,000 FEET W/S - 550,000
DRAG COEFFICIENT - C_D
.046
.042
.038
.034
.030
.026
.022
.018
.014
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

FIGURE NO. 176
AIRCRAFT DRAG COEFFICIENT
B-52A, USAF NO. 52-003
FOUR ENGINES; ASYMMETRICAL POWER CONDITIONS
NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.

SYM.	ALTITUDE (FEET)	WEIGHT (POUNDS)	W/δ (POUNDS)	ENGINES	CRUISE MACH NUMBER OPTIMUM	CRUISE MACH NUMBER RECOMMENDED
□	20,000	242,275	550,000	5, 6, 7, 8	.570	.605
○	30,000	252,280	850,000	1, 2, 3, 4	.710	.730
△	35,000	247,000	1,050,000	5, 6, 7, 8	.690	.710

--- INDICATES SYMMETRICAL POWER CONDITIONS



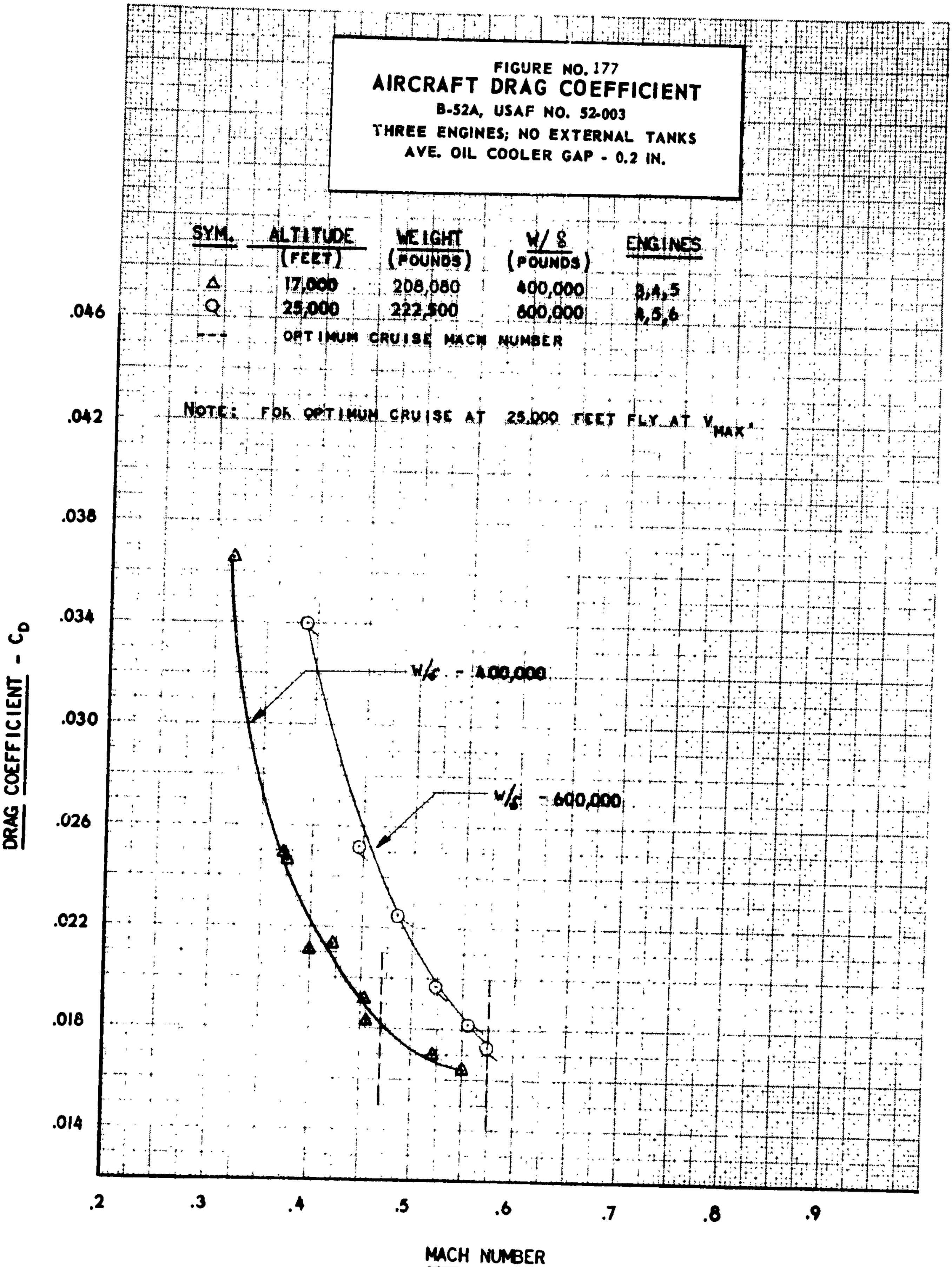


FIGURE NO. 177
AIRCRAFT DRAG COEFFICIENT
B-52A, USAF NO. 52-003
THREE ENGINES; NO EXTERNAL TANKS
AVE. OIL COOLER GAP - 0.2 IN.
SYM. | ALTITUDE (FEET) | WEIGHT (POUNDS) | W/δ (POUNDS) | ENGINES
△ 17,000 208,080 400,000 3,4,5
○ 25,000 222,500 600,000 4,5,6
OPTIMUM CRUISE MACH NUMBER
NOTE: FOR OPTIMUM CRUISE AT 25,000 FEET FLY AT V MAX.
W/δ - 400,000
W/δ - 600,000
DRAG COEFFICIENT - C_D
.046
.042
.038
.034
.030
.026
.022
.018
.014
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER

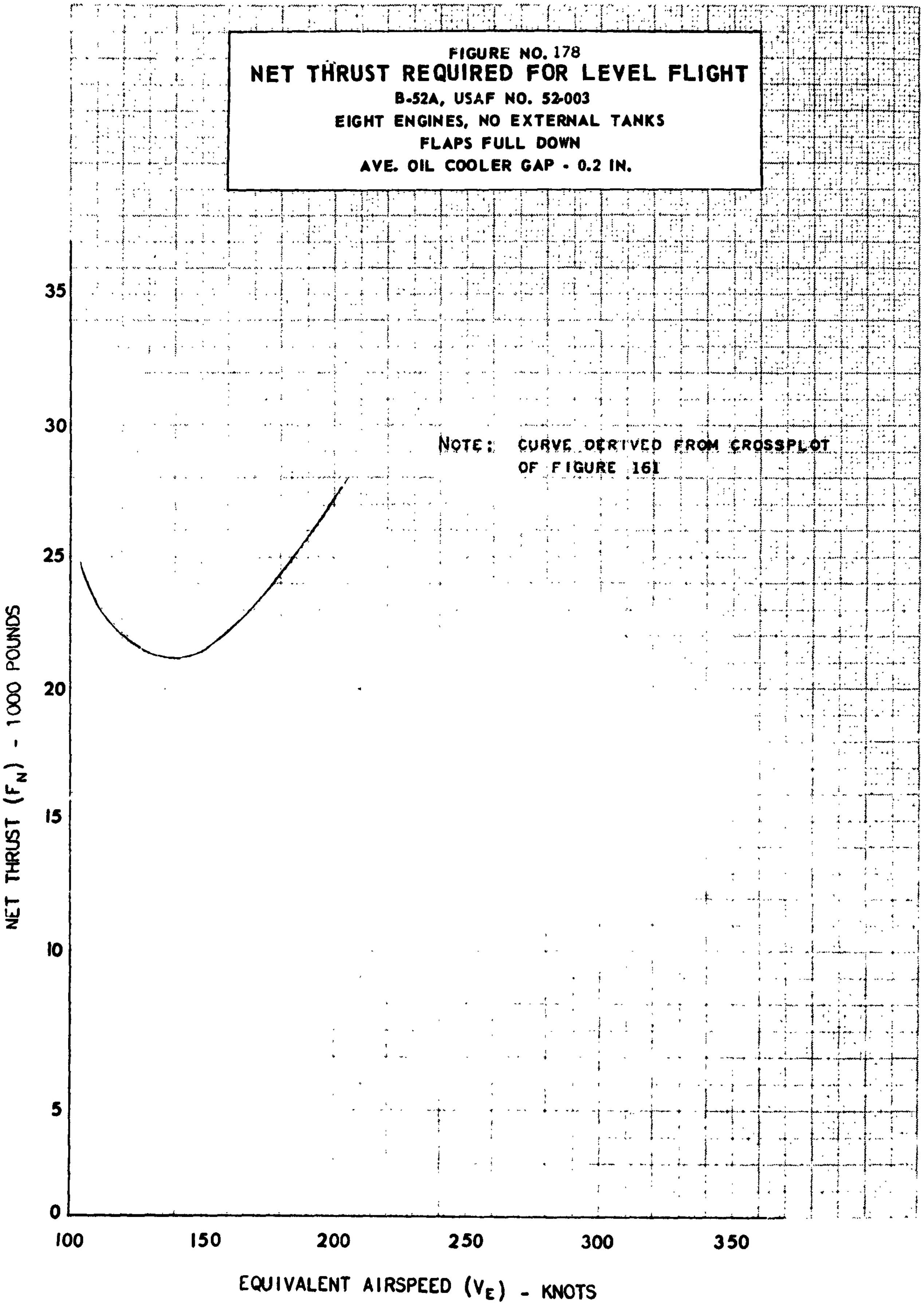


FIGURE NO. 178
NET THRUST REQUIRED FOR LEVEL FLIGHT
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS FULL DOWN
AVE. OIL COOLER GAP - 0.2 IN.
NOTE: CURVE DERIVED FROM CROSSPLOT OF FIGURE 161
NET THRUST (F_N) - 1000 POUNDS
0
5
10
15
20
25
30
35
100
150
200
250
300
350
EQUIVALENT AIRSPEED (V_E) - KNOTS

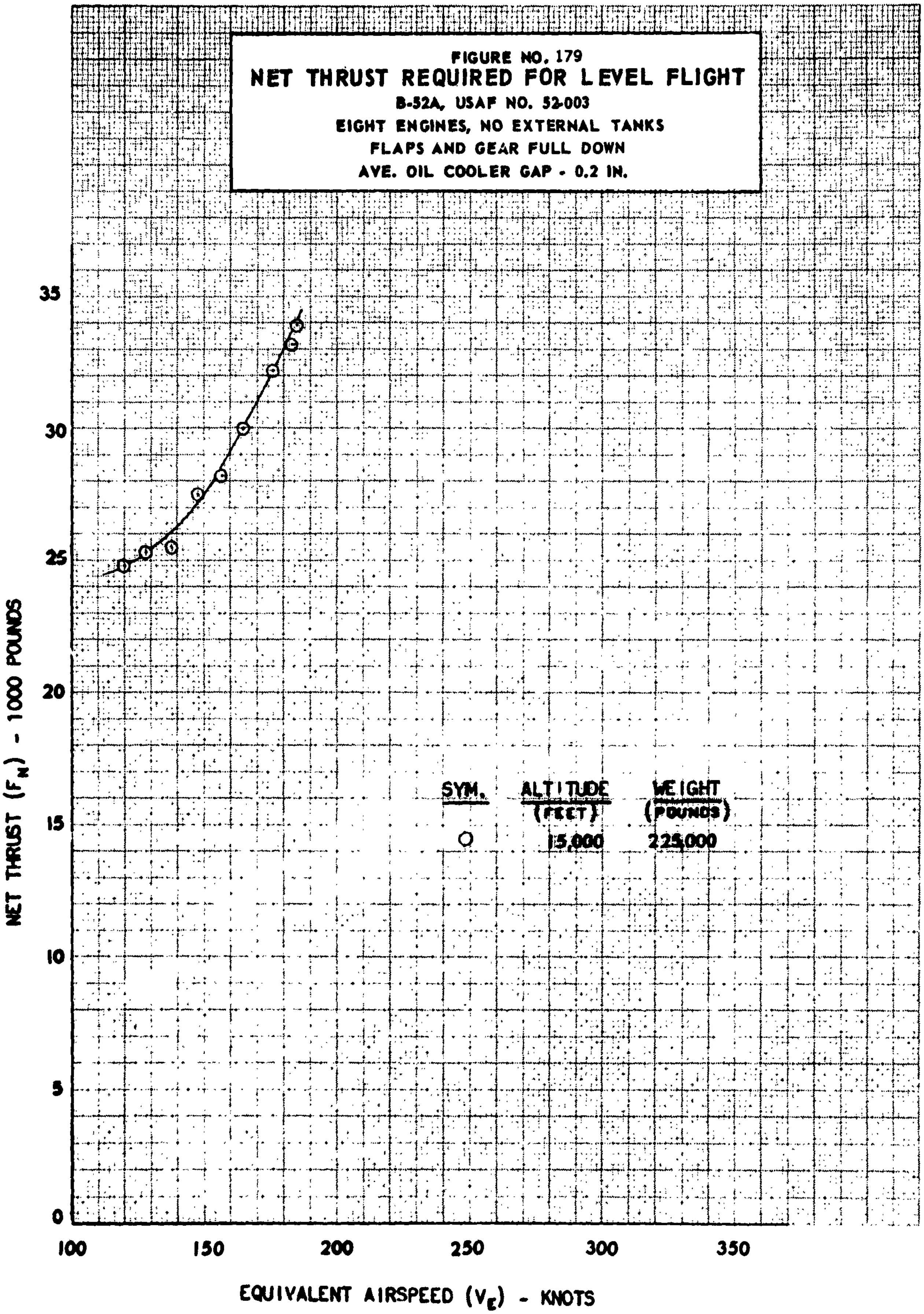


FIGURE NO. 179
NET THRUST REQUIRED FOR LEVEL FLIGHT
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS AND GEAR FULL DOWN
AVE. OIL COOLER GAP - 0.2 IN.
SYM. ALTITUDE (FEET) WEIGHT (POUNDS)
15,000 225,000
NET THRUST (F_N) - 1000 POUNDS
0
5
10
15
20
25
30
35
100
150
200
250
300
350
EQUIVALENT AIRSPEED (V_E) - KNOTS

FIGURE NO. 180
NET THRUST REQUIRED FOR LEVEL FLIGHT
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS AND GEAR FULL DOWN, AIR BRAKES FULL UP
AVE. OIL COOLER GAP - 0.2 IN.

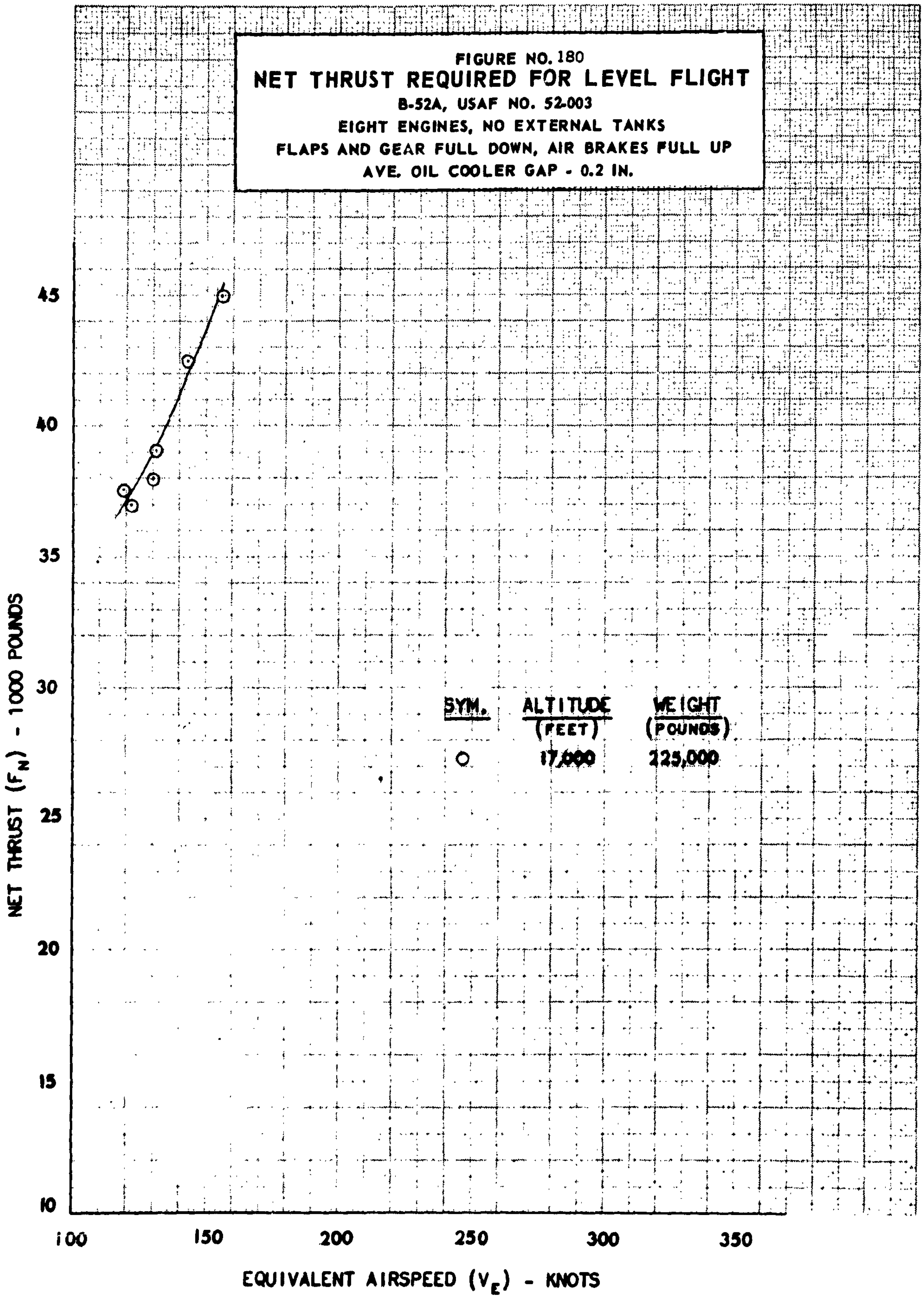
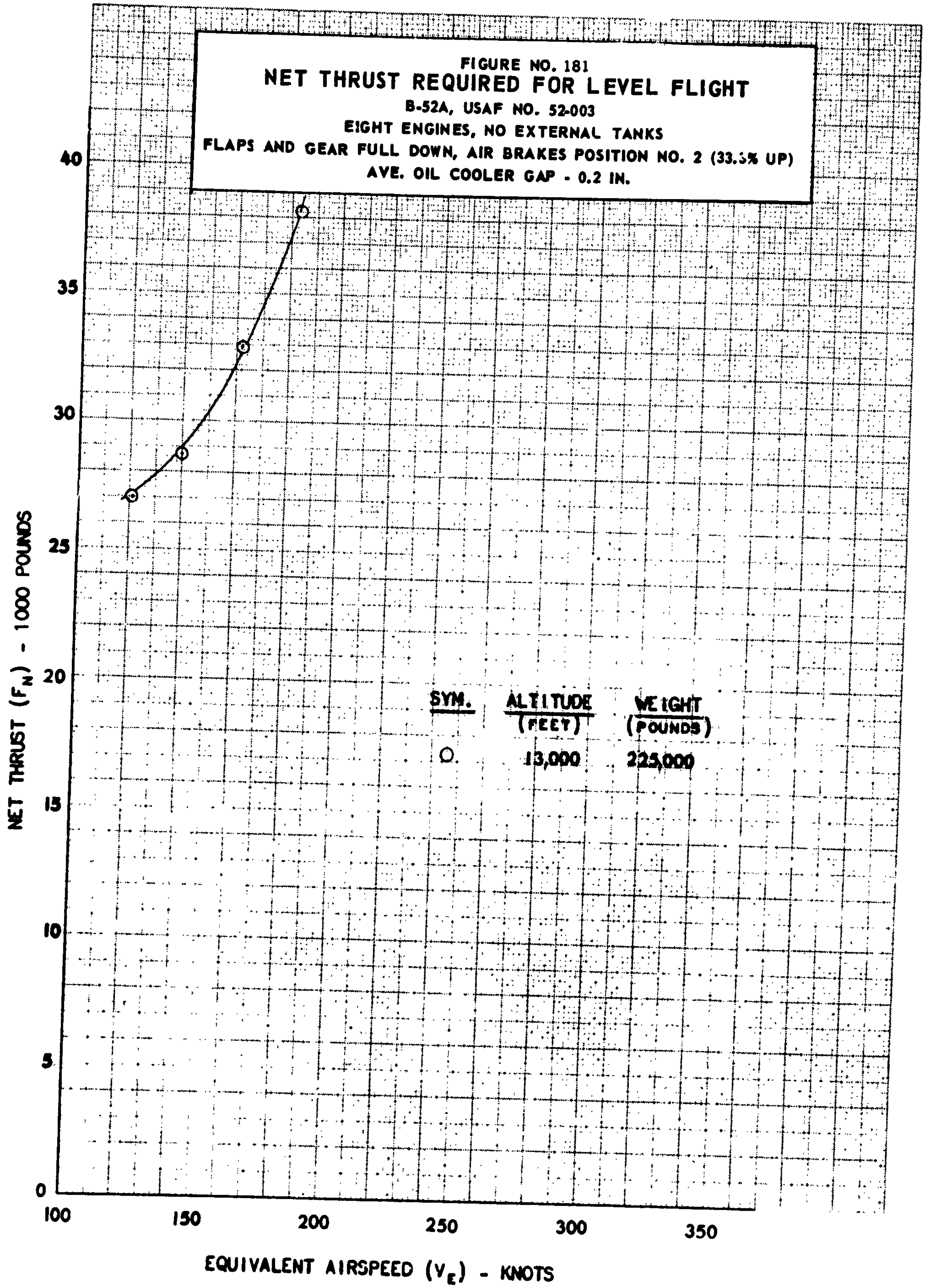


FIGURE NO. 181
NET THRUST REQUIRED FOR LEVEL FLIGHT
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS AND GEAR FULL DOWN, AIR BRAKES POSITION NO. 2 (33.3% UP)
AVE. OIL COOLER GAP - 0.2 IN.



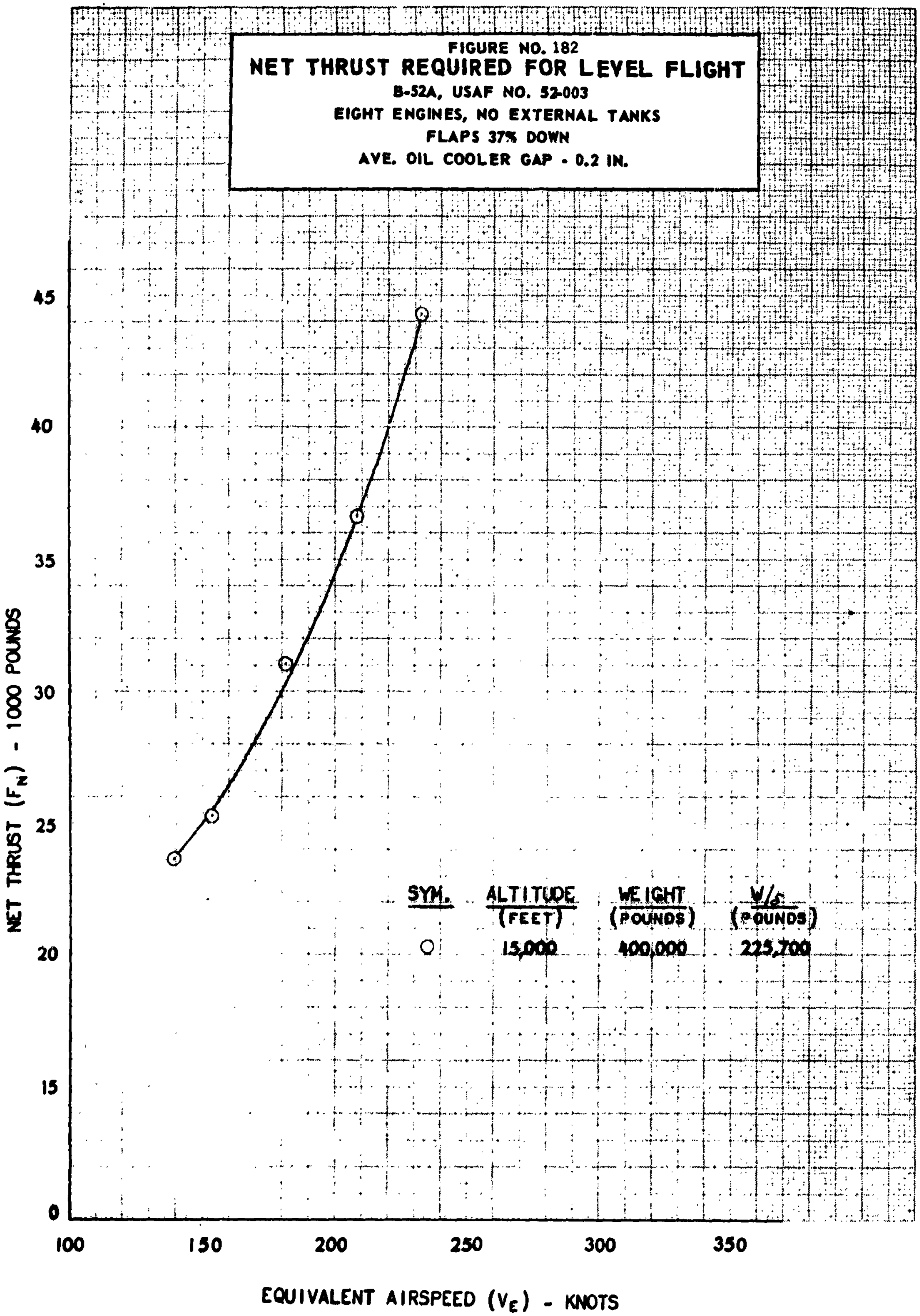


FIGURE NO. 182
NET THRUST REQUIRED FOR LEVEL FLIGHT
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
FLAPS 37% DOWN
AVE. OIL COOLER GAP - 0.2 IN.
SYM.
ALTITUDE (FEET)
WEIGHT (POUNDS)
W/δ (POUNDS)
15,000
400,000
225,700
NET THRUST (F_N) - 1000 POUNDS
0
15
20
25
30
35
40
45
100
150
200
250
300
350
EQUIVALENT AIRSPEED (V_E) - KNOTS

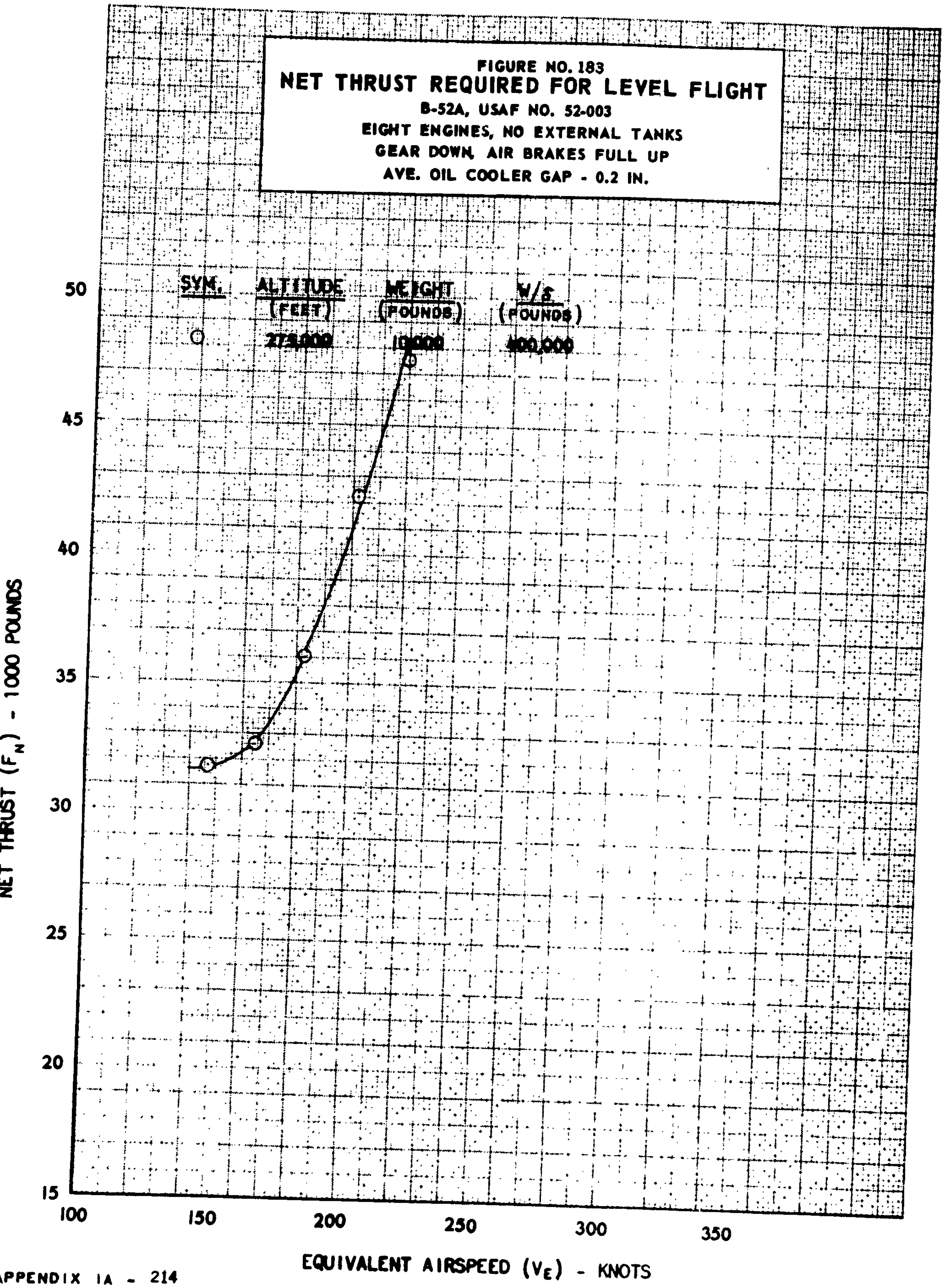


FIGURE NO. 183
NET THRUST REQUIRED FOR LEVEL FLIGHT
B-52A, USAF NO. 52-003
EIGHT ENGINES, NO EXTERNAL TANKS
GEAR DOWN, AIR BRAKES FULL UP
AVE. OIL COOLER GAP - 0.2 IN.

DESCENTS

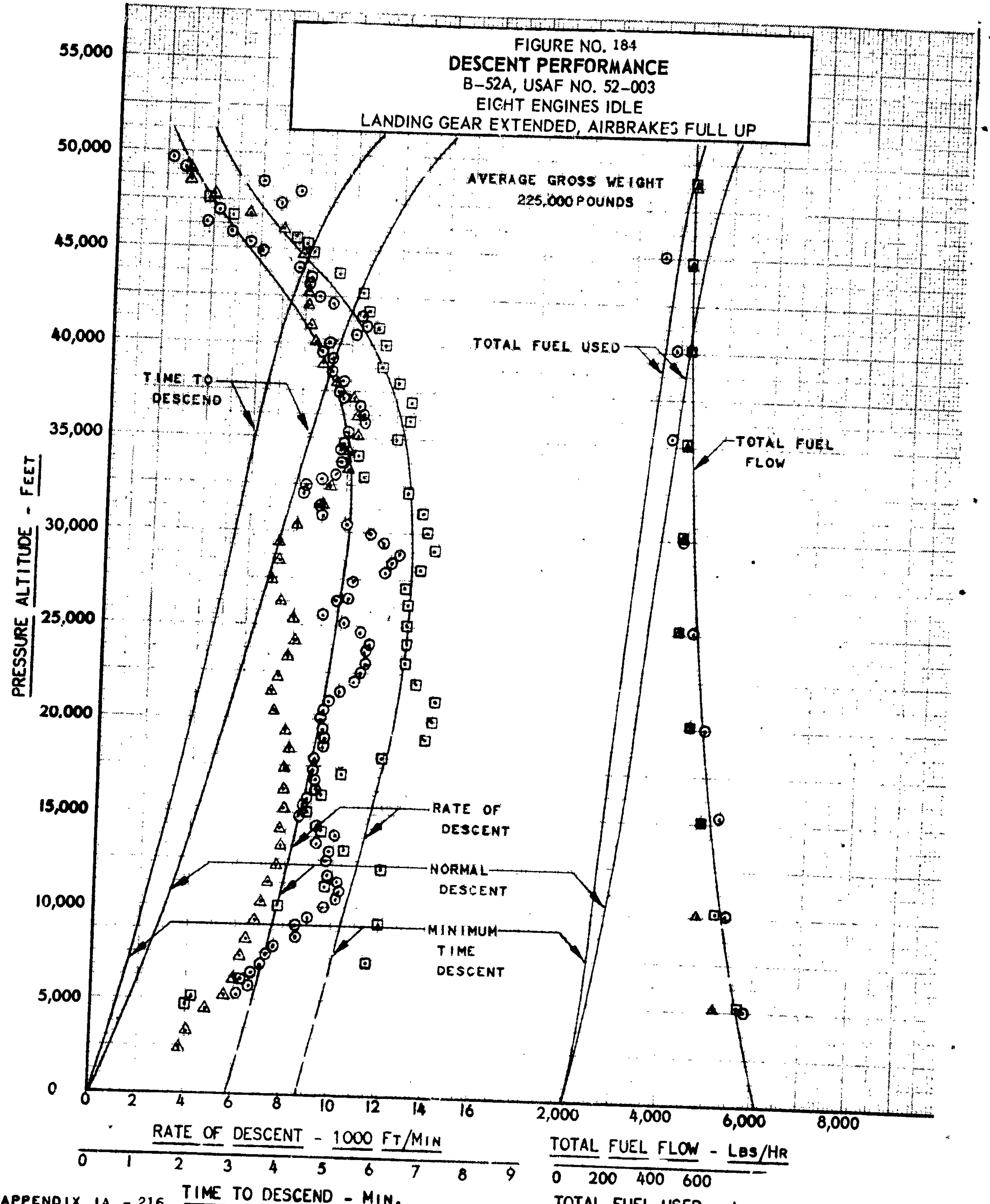
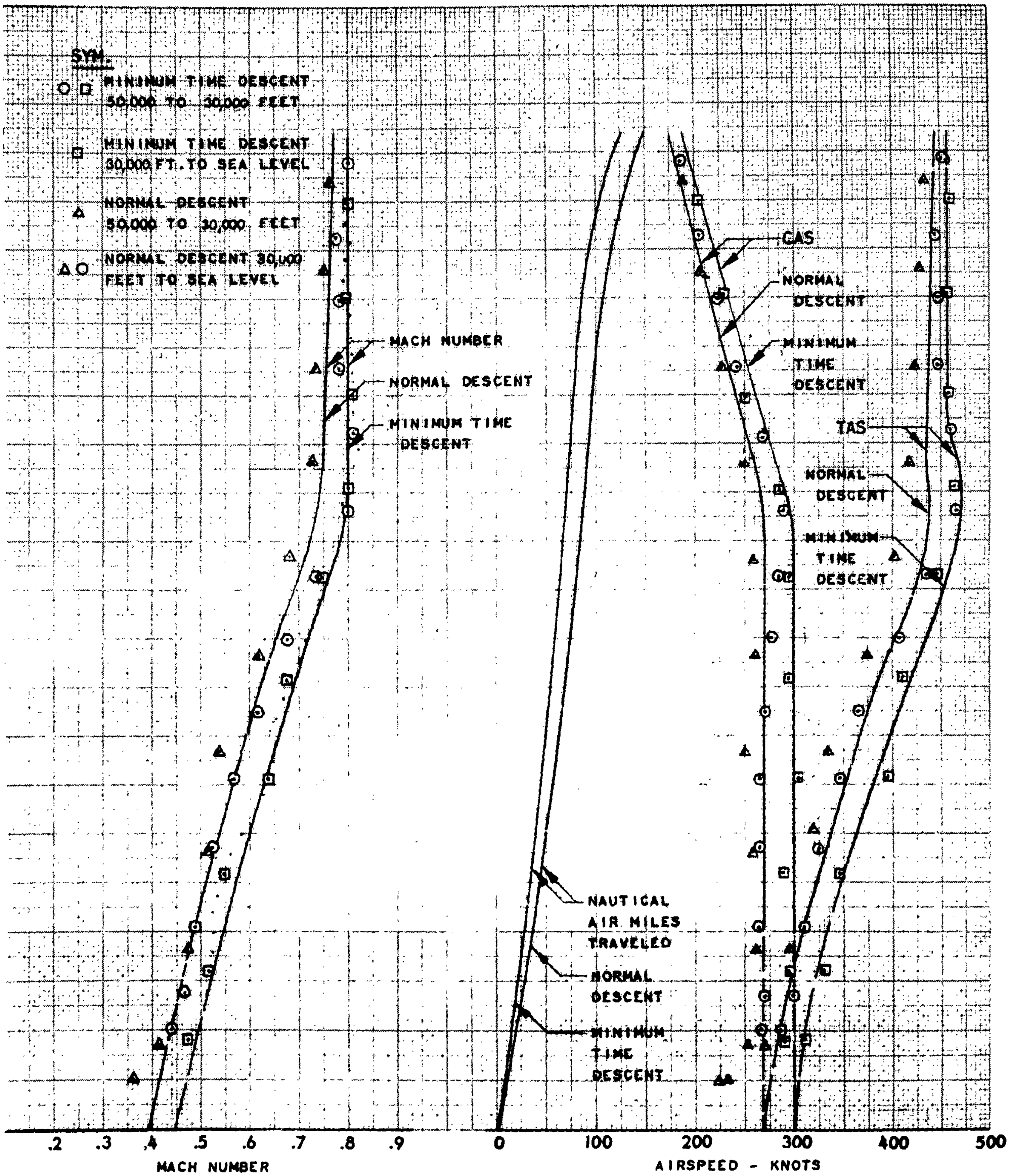


FIGURE NO. 184
DESCENT PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES IDLE
LANDING GEAR EXTENDED, AIRBRAKES FULL UP
AVERAGE GROSS WEIGHT
225,000 POUNDS
TIME TO DESCEND
TOTAL FUEL USED
TOTAL FUEL FLOW
RATE OF DESCENT
NORMAL DESCENT
MINIMUM TIME DESCENT
PRESSURE ALTITUDE - FEET
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0 2 4 6 8 10 12 14 16
2,000 4,000 6,000 8,000
RATE OF DESCENT - 1000 FT/MIN
0 1 2 3 4 5 6 7 8 9
TIME TO DESCEND - MIN.
TOTAL FUEL FLOW - LBS/HR
0 200 400 600
TOTAL FUEL USED - LBS.


SYM.
MINIMUM TIME DESCENT 50,000 TO 30,000 FEET
MINIMUM TIME DESCENT 30,000 FT. TO SEA LEVEL
NORMAL DESCENT 50,000 TO 30,000 FEET
NORMAL DESCENT 30,000 FEET TO SEA LEVEL
MACH NUMBER
NORMAL DESCENT
MINIMUM TIME DESCENT
GAS
NORMAL DESCENT
MINIMUM TIME DESCENT
TAS
NORMAL DESCENT
MINIMUM TIME DESCENT
NAUTICAL AIR MILES TRAVELED
NORMAL DESCENT
MINIMUM TIME DESCENT
.2 .3 .4 .5 .6 .7 .8 .9
MACH NUMBER
0 100 200 300 400 500
AIRSPEED - KNOTS
0 10 20 30 40 50
NAUTICAL AIR MILES TRAVELED

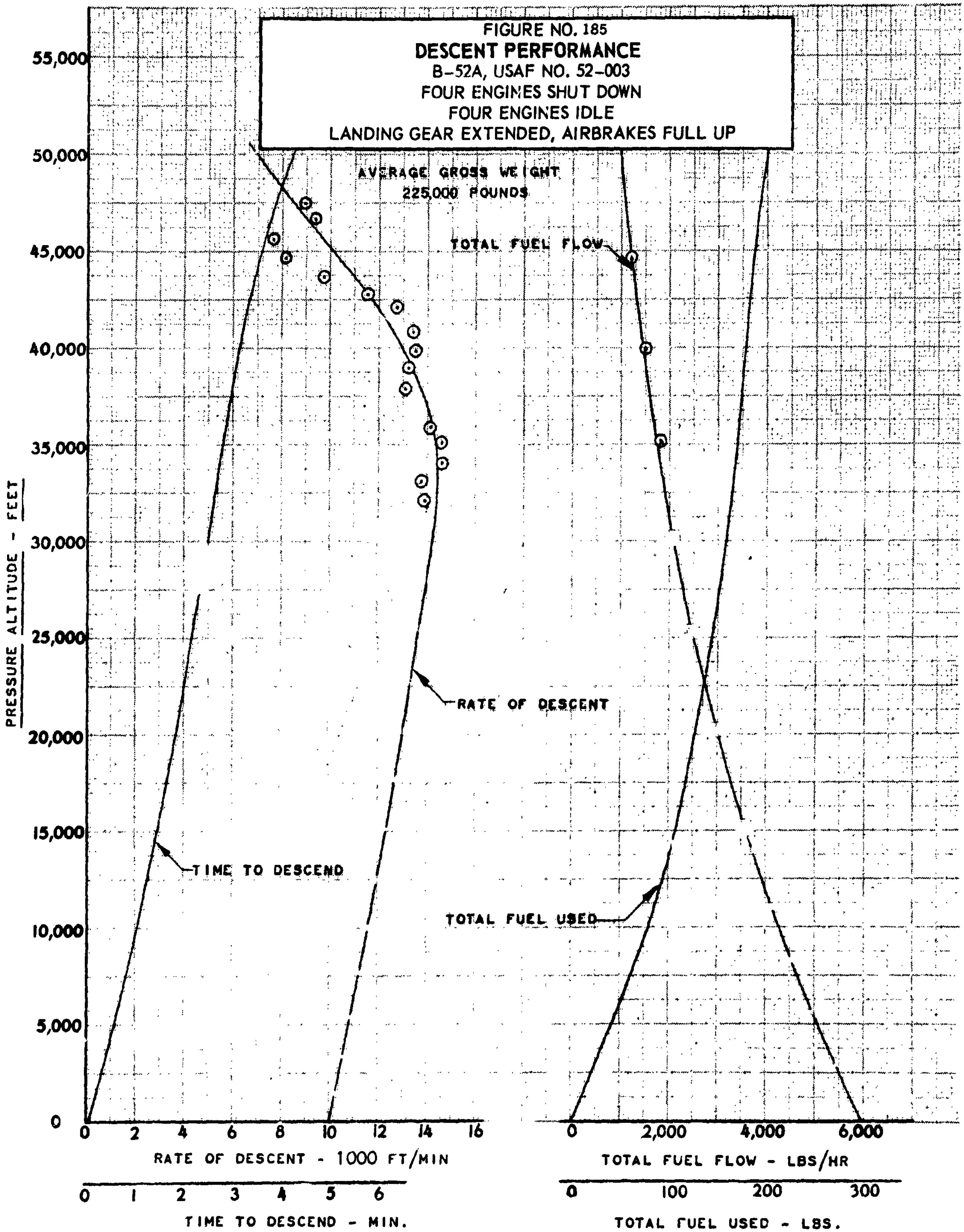
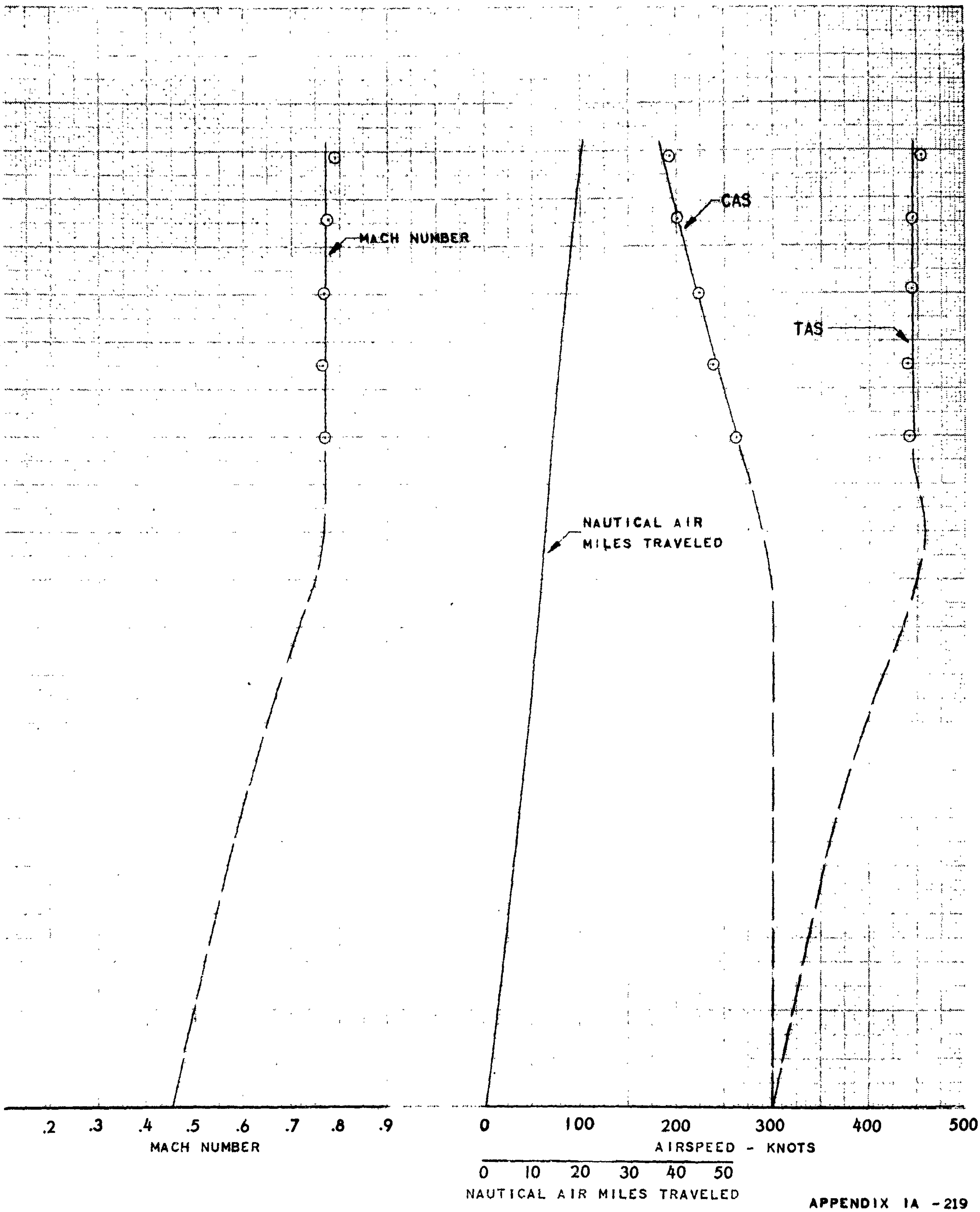


FIGURE NO. 185
DESCENT PERFORMANCE
B-52A, USAF NO. 52-003
FOUR ENGINES SHUT DOWN
FOUR ENGINES IDLE
LANDING GEAR EXTENDED, AIRBRAKES FULL UP
AVERAGE GROSS WEIGHT
225,000 POUNDS
TOTAL FUEL FLOW
RATE OF DESCENT
TIME TO DESCEND
TOTAL FUEL USED
PRESSURE ALTITUDE - FEET
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
50,000
55,000
0 2 4 6 8 10 12 14 16
RATE OF DESCENT - 1000 FT/MIN
0 1 2 3 4 5 6
TIME TO DESCEND - MIN.
0 2,000 4,000 6,000
TOTAL FUEL FLOW - LBS/HR
0 100 200 300
TOTAL FUEL USED - LBS.


MACH NUMBER
CAS
TAS
NAUTICAL AIR MILES TRAVELED
.2 .3 .4 .5 .6 .7 .8 .9
MACH NUMBER
0 100 200 300 400 500
AIRSPEED - KNOTS
0 10 20 30 40 50
NAUTICAL AIR MILES TRAVELED

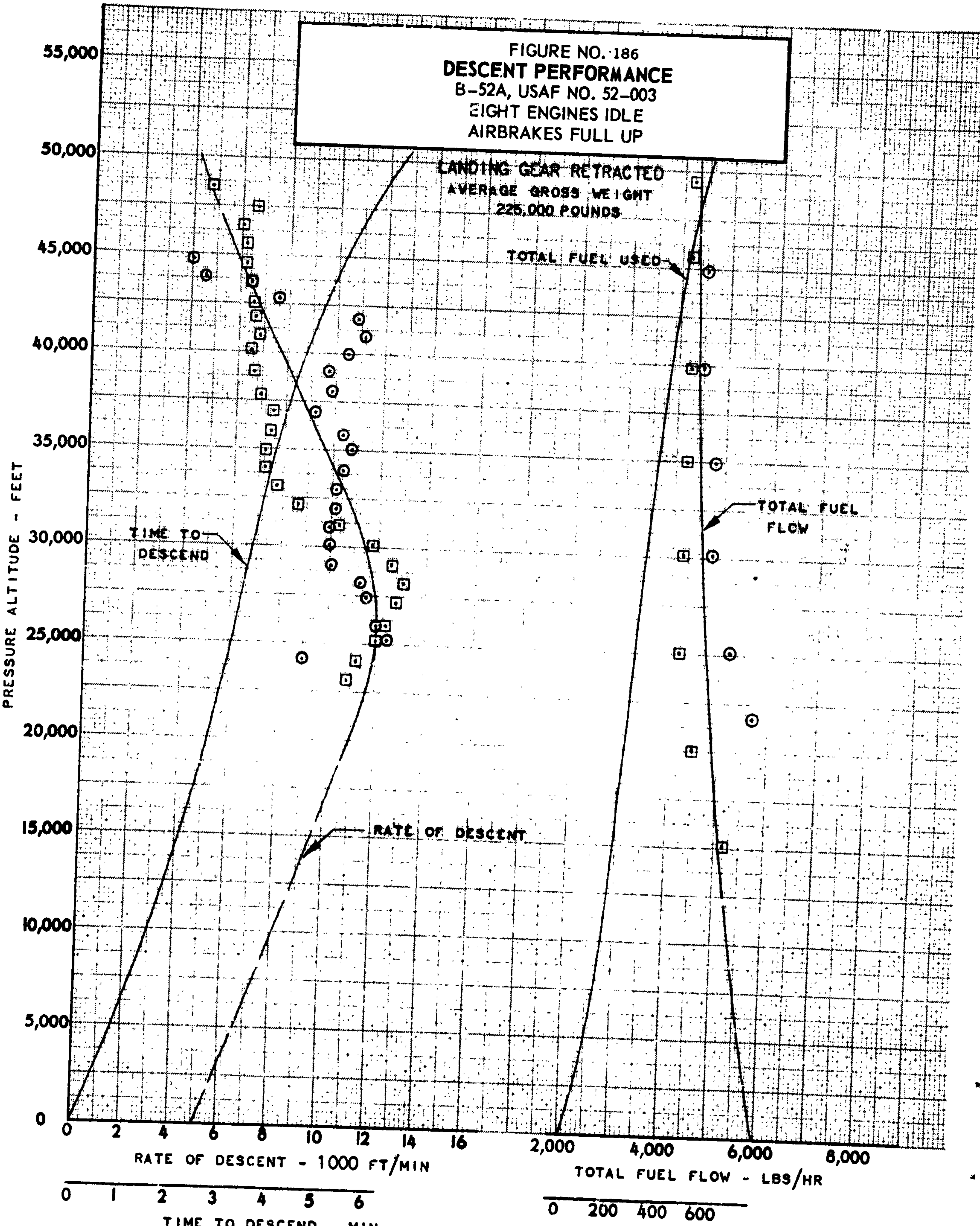
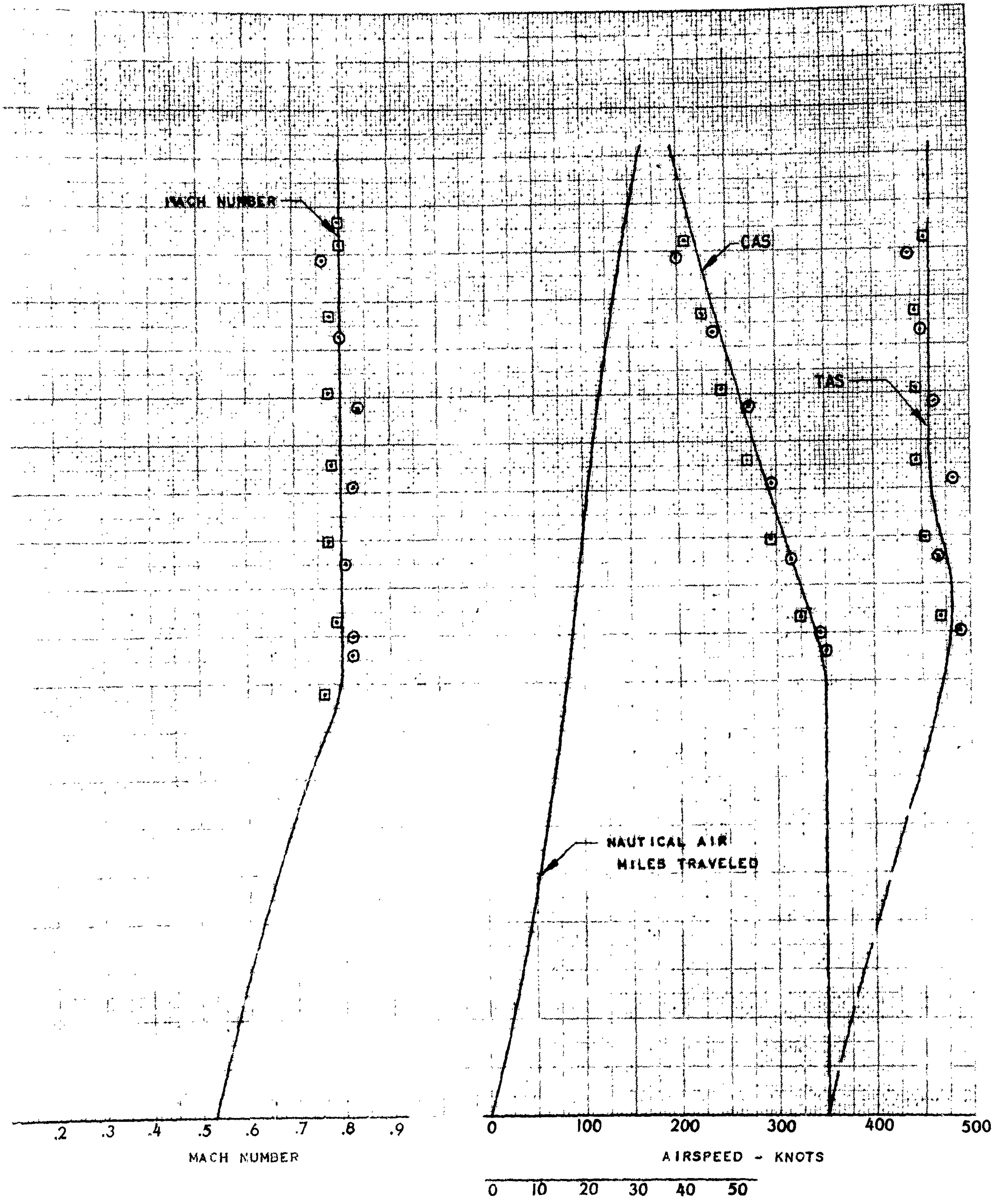


FIGURE NO. 186
DESCENT PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES IDLE
AIRBRAKES FULL UP
LANDING GEAR RETRACTED
AVERAGE GROSS WEIGHT
225,000 POUNDS
TOTAL FUEL USED
TOTAL FUEL FLOW
TIME TO DESCEND
RATE OF DESCENT
PRESSURE ALTITUDE - FEET
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0 2 4 6 8 10 12 14 16
RATE OF DESCENT - 1000 FT/MIN
0 1 2 3 4 5 6
TIME TO DESCEND - MIN.
2,000 4,000 6,000 8,000
TOTAL FUEL FLOW - LBS/HR
0 200 400 600
TOTAL FUEL USED - LBS.


MACH NUMBER
CAS
TAS
NAUTICAL AIR
MILES TRAVELED
.2
.3
.4
.5
.6
.7
.8
.9
MACH NUMBER
0
100
200
300
400
500
AIRSPEED - KNOTS
0
10
20
30
40
50
NAUTICAL AIR MILES TRAVELED

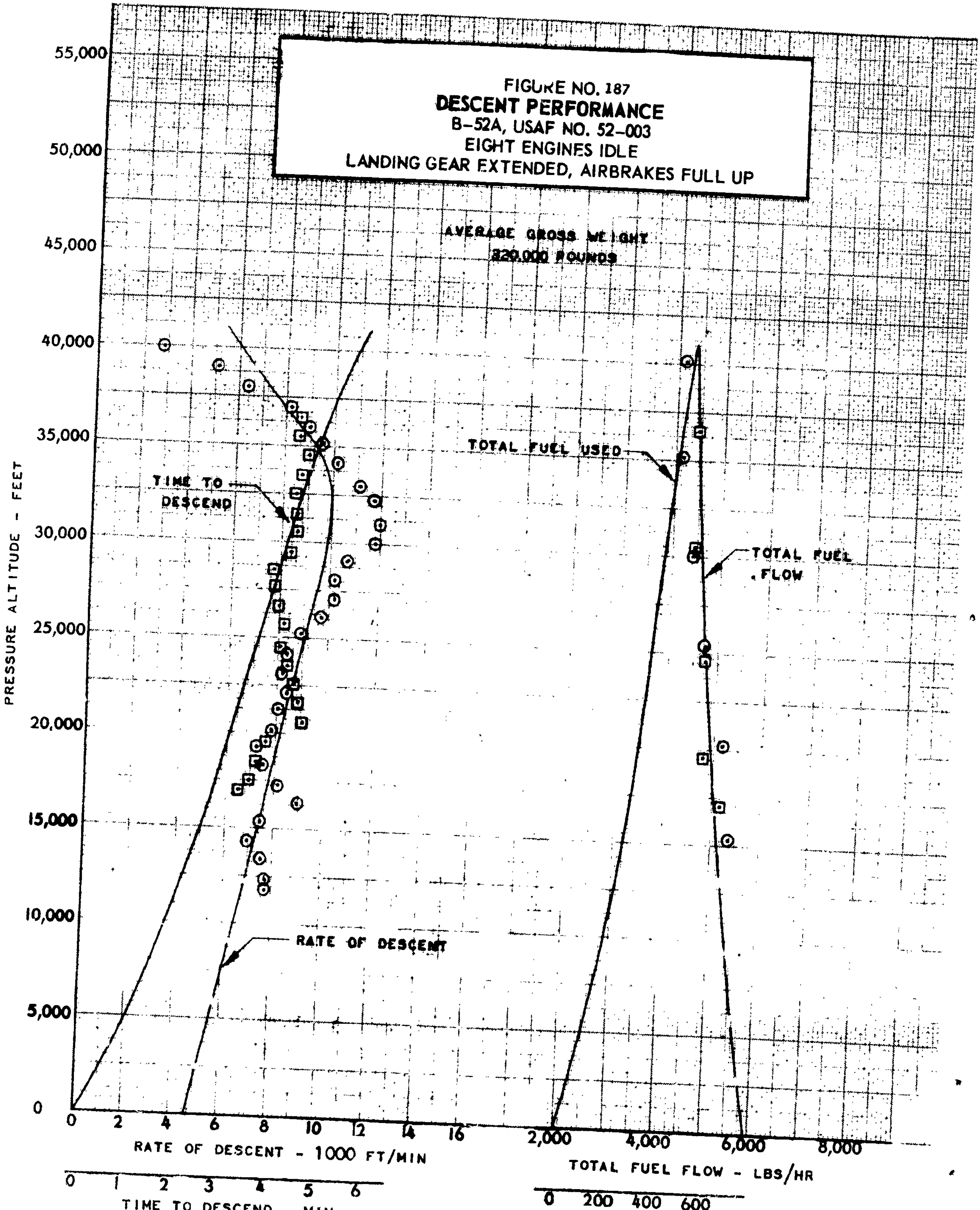
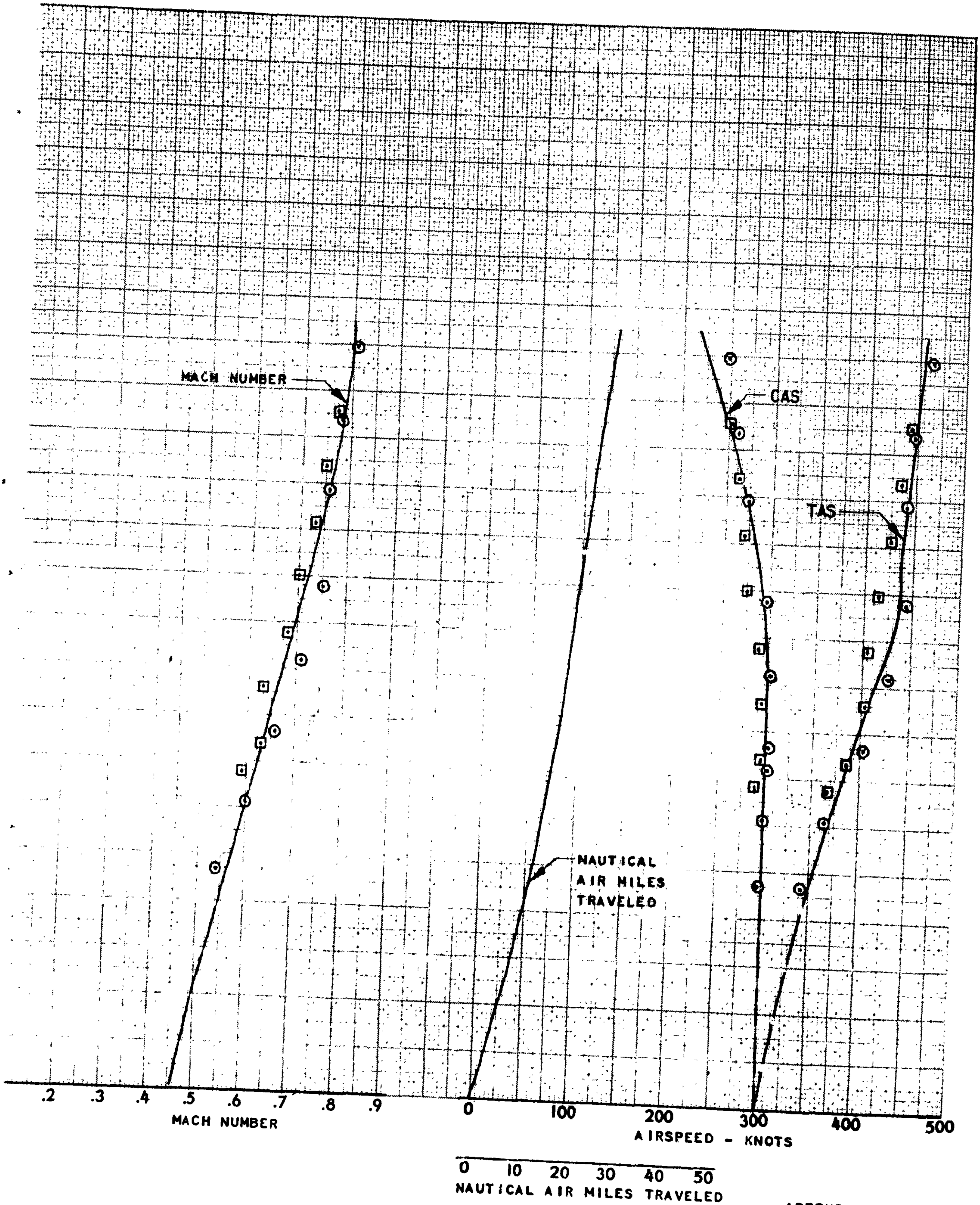


FIGURE NO. 187
DESCENT PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES IDLE
LANDING GEAR EXTENDED, AIRBRAKES FULL UP
AVERAGE GROSS WEIGHT
320,000 POUNDS
PRESSURE ALTITUDE - FEET
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
TIME TO DESCEND
RATE OF DESCENT
TOTAL FUEL USED
TOTAL FUEL FLOW
0 2 4 6 8 10 12 14 16
RATE OF DESCENT - 1000 FT/MIN
0 1 2 3 4 5 6
TIME TO DESCEND - MIN.
2,000 4,000 6,000 8,000
TOTAL FUEL FLOW - LBS/HR
0 200 400 600
TOTAL FUEL USED - LBS.



MACH NUMBER
NAUTICAL AIR MILES TRAVELED
CAS
TAS
.2 .3 .4 .5 .6 .7 .8 .9
MACH NUMBER
0 100 200 300 400 500
AIRSPEED - KNOTS
0 10 20 30 40 50
NAUTICAL AIR MILES TRAVELED

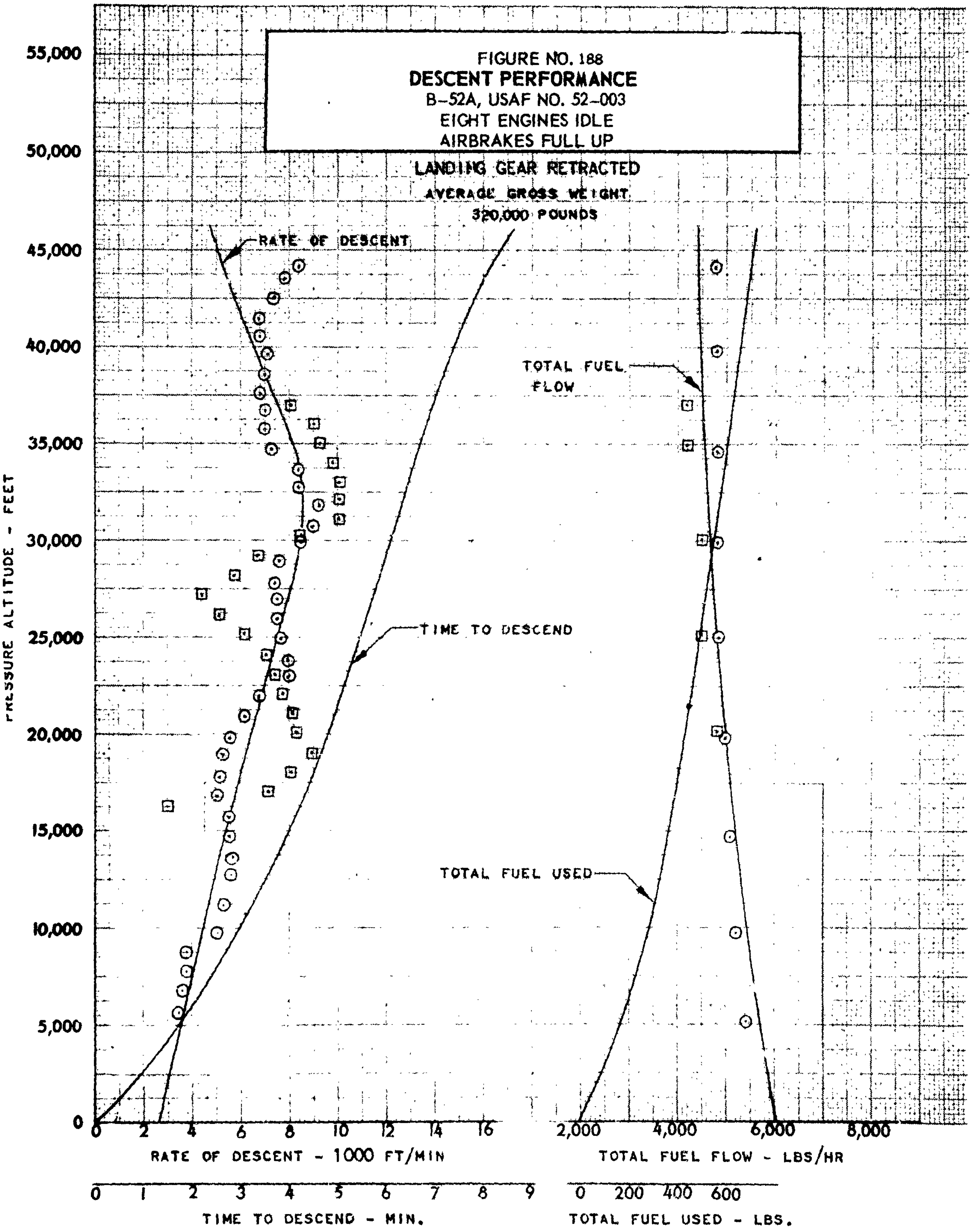
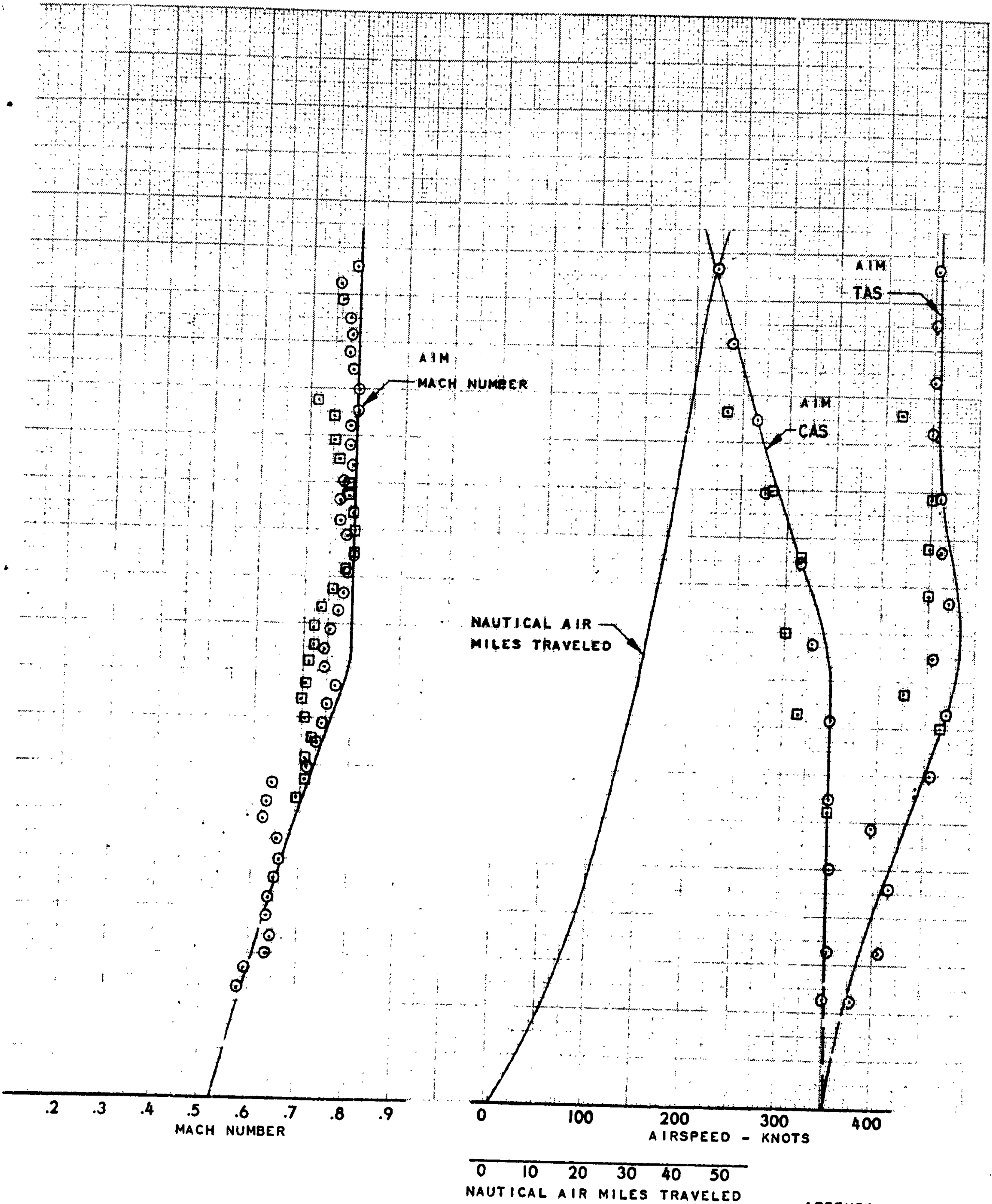


FIGURE NO. 188
DESCENT PERFORMANCE
B-52A, USAF NO. 52-003
EIGHT ENGINES IDLE
AIRBRAKES FULL UP
LANDING GEAR RETRACTED
AVERAGE GROSS WEIGHT
320,000 POUNDS
RATE OF DESCENT
TIME TO DESCEND
TOTAL FUEL FLOW
TOTAL FUEL USED
PRESSURE ALTITUDE - FEET
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0 2 4 6 8 10 12 14 16
RATE OF DESCENT - 1000 FT/MIN
0 1 2 3 4 5 6 7 8 9
TIME TO DESCEND - MIN.
2,000 4,000 6,000 8,000
TOTAL FUEL FLOW - LBS/HR
0 200 400 600
TOTAL FUEL USED - LBS.


AIM
MACH NUMBER
AIM
TAS
AIM
CAS
NAUTICAL AIR
MILES TRAVELED
.2 .3 .4 .5 .6 .7 .8 .9
MACH NUMBER
0 100 200 300 400
AIRSPEED - KNOTS
0 10 20 30 40 50
NAUTICAL AIR MILES TRAVELED

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OF PRESENTING PLOTS

AIRSPEED CALIBRATION

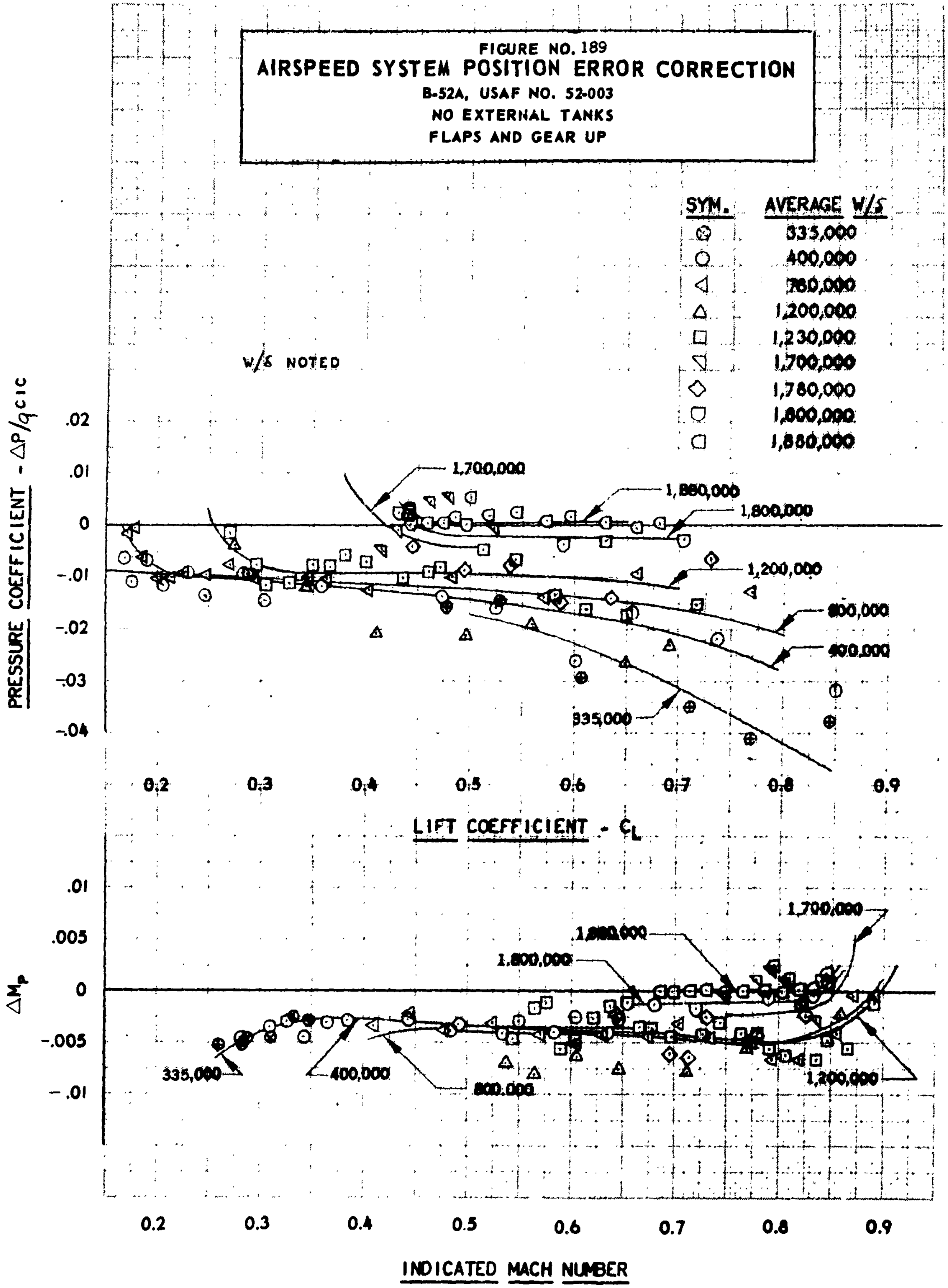


FIGURE NO. 189
AIRSPEED SYSTEM POSITION ERROR CORRECTION
B-52A, USAF NO. 52-003
NO EXTERNAL TANKS
FLAPS AND GEAR UP
SYM.
AVERAGE W/S
335,000
400,000
780,000
1,200,000
1,230,000
1,700,000
1,780,000
1,800,000
1,880,000
W/S NOTED
PRESSURE COEFFICIENT - ΔP/qcic
.02
.01
0
-.01
-.02
-.03
-.04
1,700,000
1,880,000
1,800,000
1,200,000
800,000
400,000
335,000
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
LIFT COEFFICIENT - C_L
.01
.005
0
-.005
-.01
ΔM_p
1,700,000
1,880,000
1,800,000
335,000
400,000
800,000
1,200,000
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
INDICATED MACH NUMBER

FIGURE NO. 190

AIRSPEED SYSTEM POSITION ERROR CORRECTION

B-52A, USAF NO. 52-003

NO EXTERNAL TANKS

CONFIGURATIONS NOTED

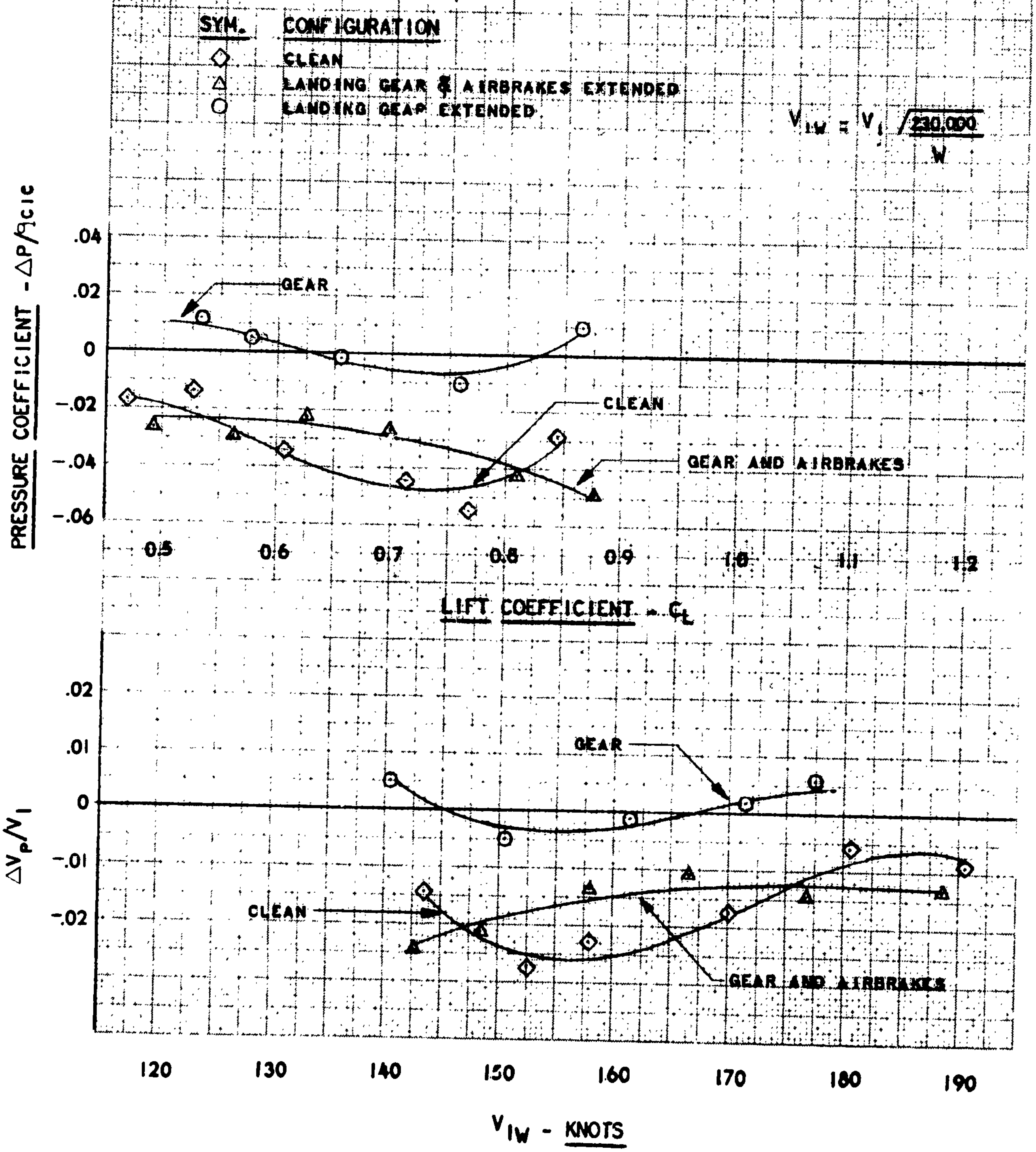


FIGURE NO. 191
AIRSPEED SYSTEM POSITION ERROR CORRECTION
B-52A, USAF NO. 52-003
NO EXTERNAL TANKS
CONFIGURATIONS NOTED

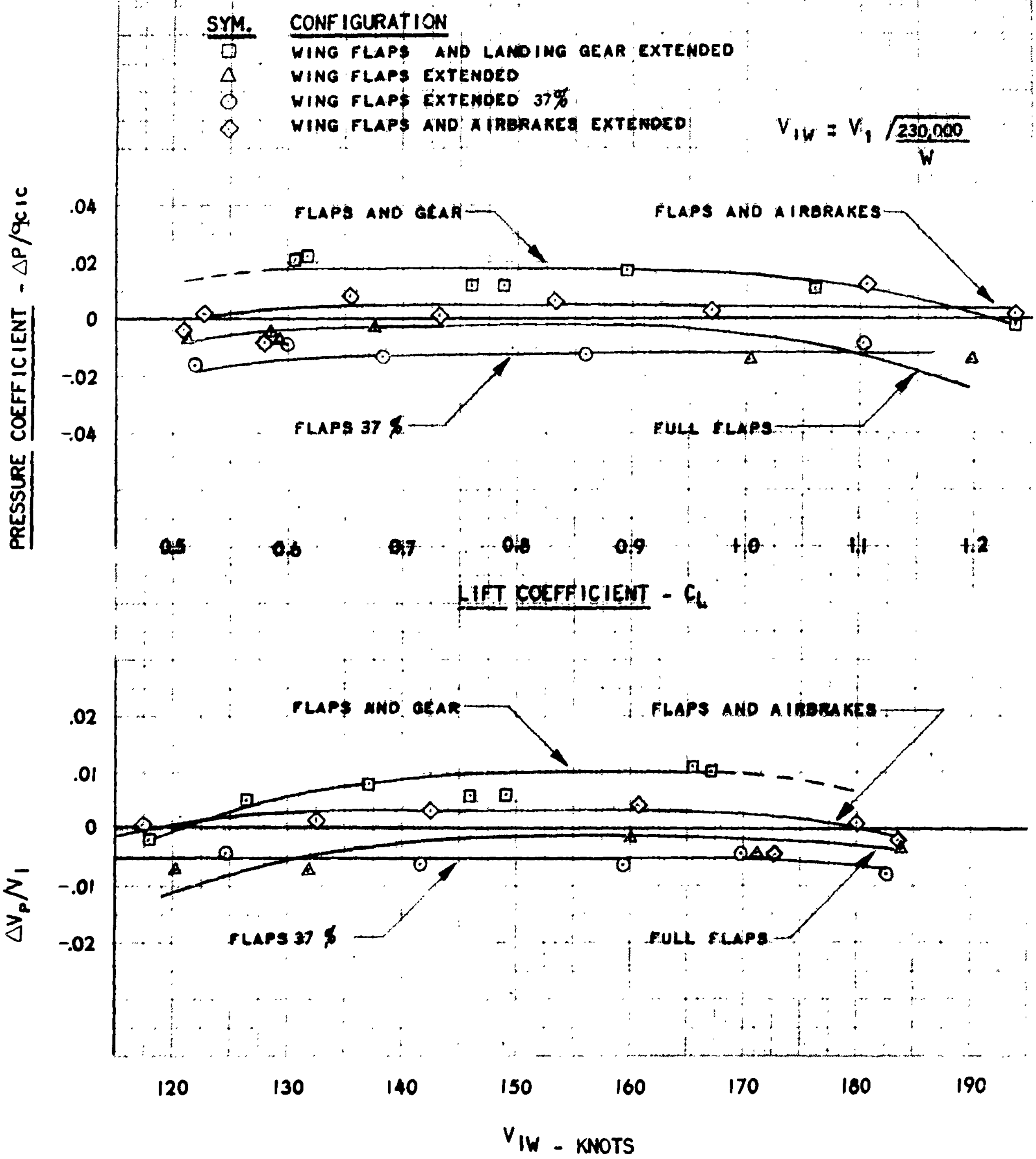
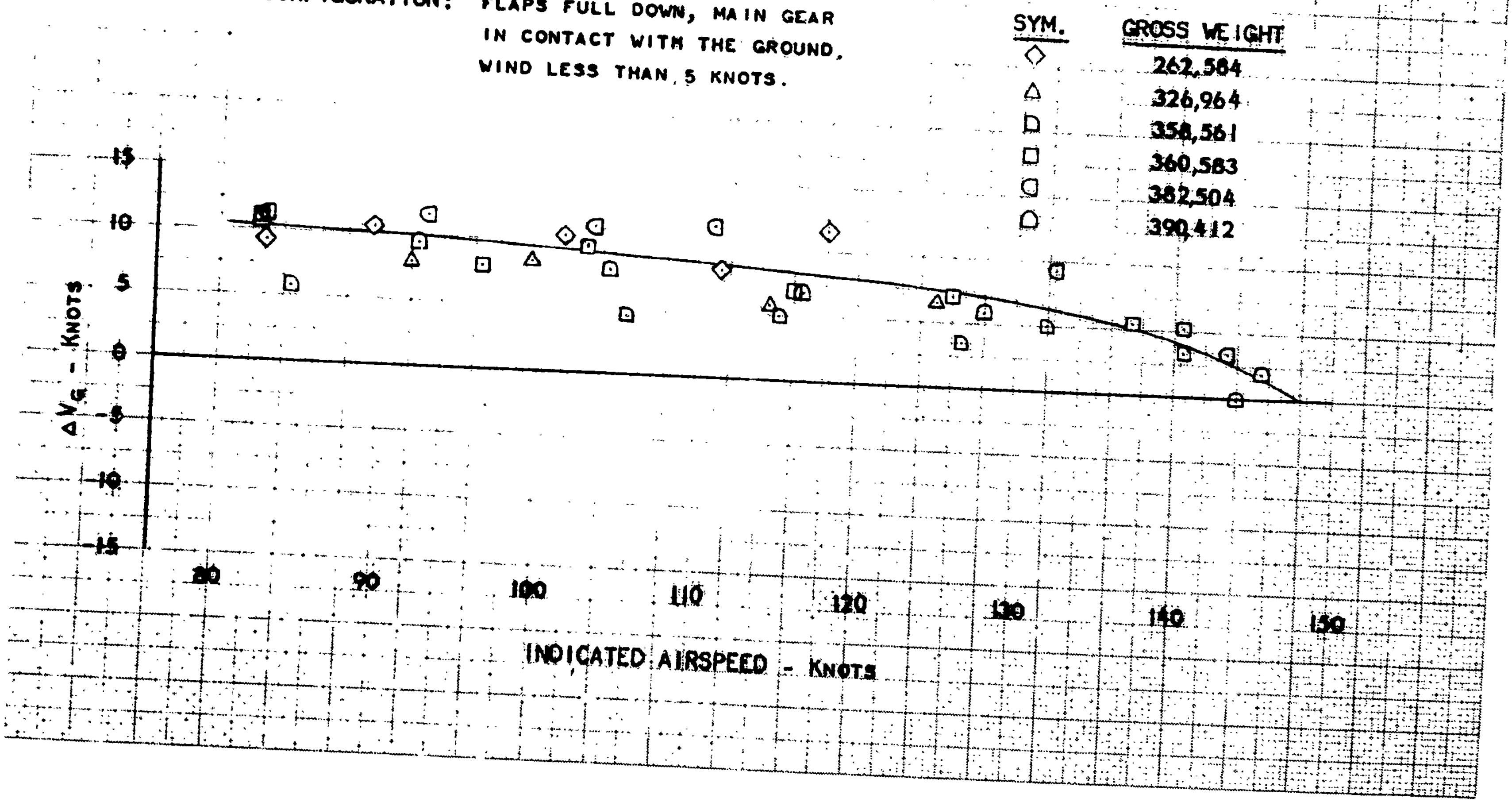


FIGURE NO. 192

AIRSPEED SYSTEM POSITION ERROR CORRECTION

B-52A, USAF NO. 52-003
NO EXTERNAL TANKS
CONFIGURATIONS NOTED

CONFIGURATION: FLAPS FULL DOWN, MAIN GEAR IN CONTACT WITH THE GROUND, WIND LESS THAN 5 KNOTS.



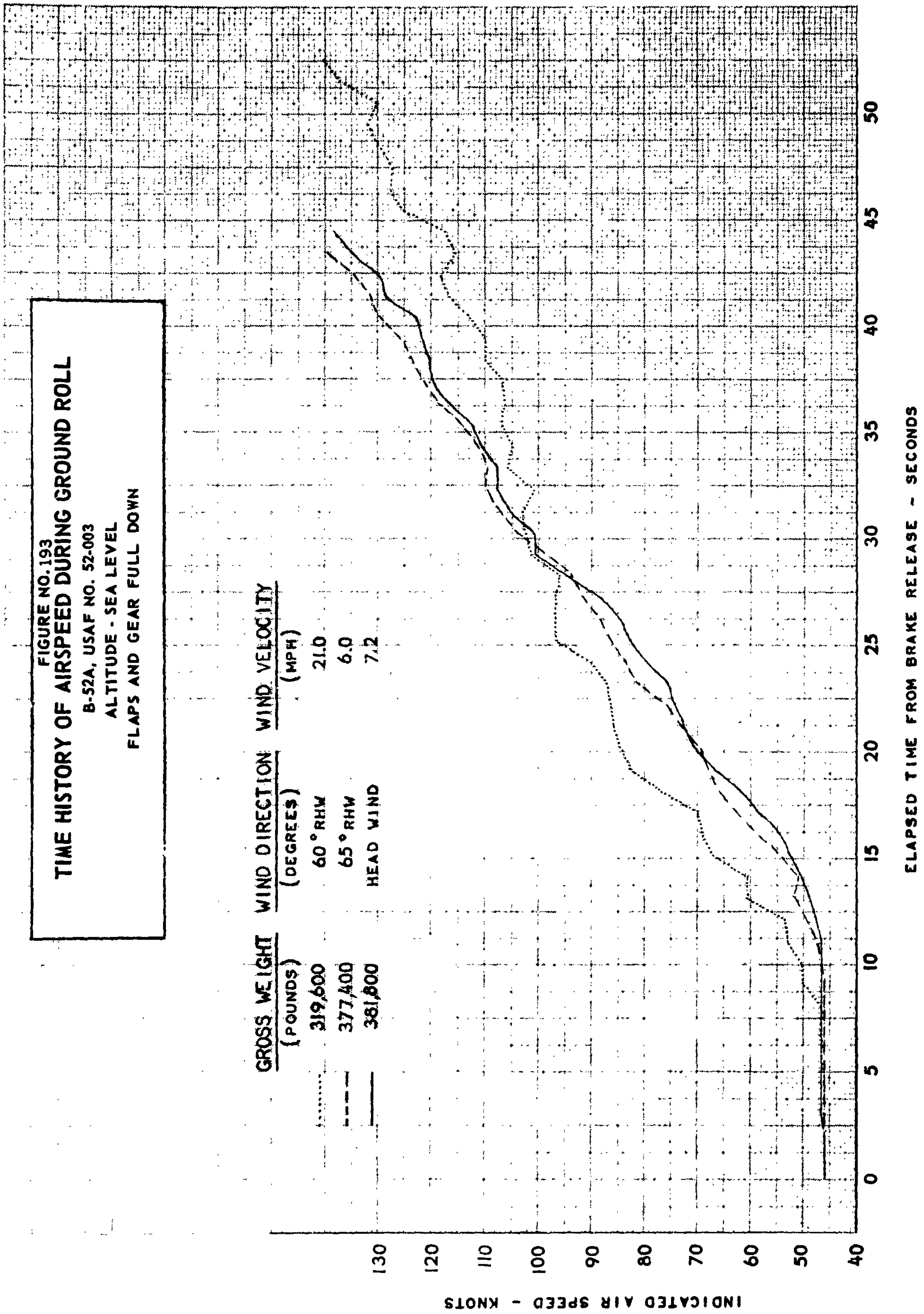


FIGURE NO. 193
TIME HISTORY OF AIRSPEED DURING GROUND ROLL
B-52A, USAF NO. 52-003
ALTITUDE - SEA LEVEL
FLAPS AND GEAR FULL DOWN
GROSS WEIGHT (POUNDS)
319,600
377,400
381,800
WIND DIRECTION (DEGREES)
60° RHW
65° RHW
HEAD WIND
WIND VELOCITY (MPH)
21.0
6.0
7.2
INDICATED AIR SPEED - KNOTS
40
50
60
70
80
90
100
110
120
130
ELAPSED TIME FROM BRAKE RELEASE - SECONDS
0
5
10
15
20
25
30
35
40
45
50

POWER PLANT

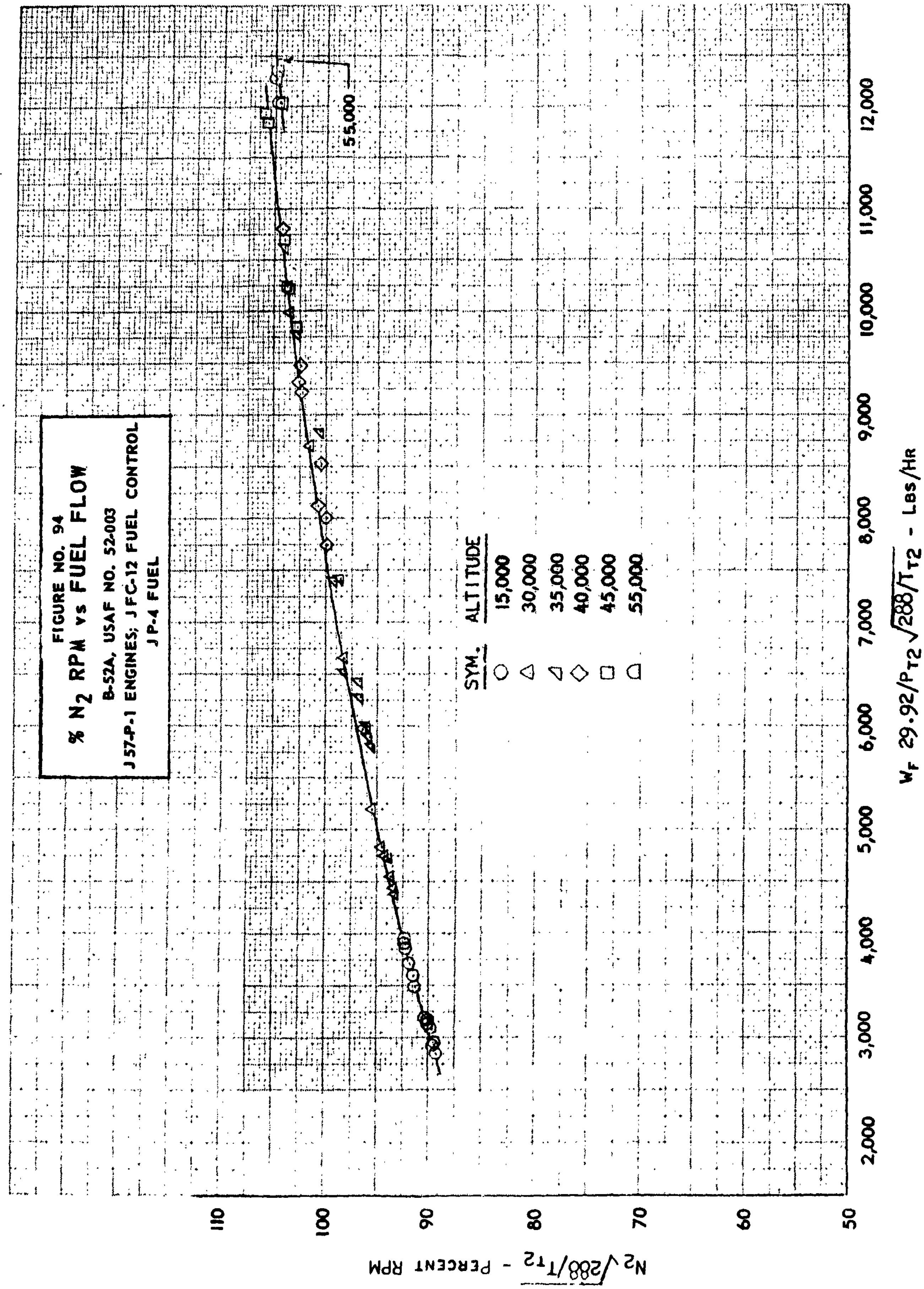


FIGURE NO. 94
% N_2 RPM vs FUEL FLOW
B-52A, USAF NO. 52-003
J57-P-1 ENGINES; JFC-12 FUEL CONTROL
JP-4 FUEL
SYM.
ALTITUDE
15,000
30,000
35,000
40,000
45,000
55,000
55,000
$W_F\ 29.92/P_{T2}\sqrt{288/T_{T2}}$ - LBS/HR
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
$N_2\sqrt{288/T_{T2}}$ - PERCENT RPM
50
60
70
80
90
100
110

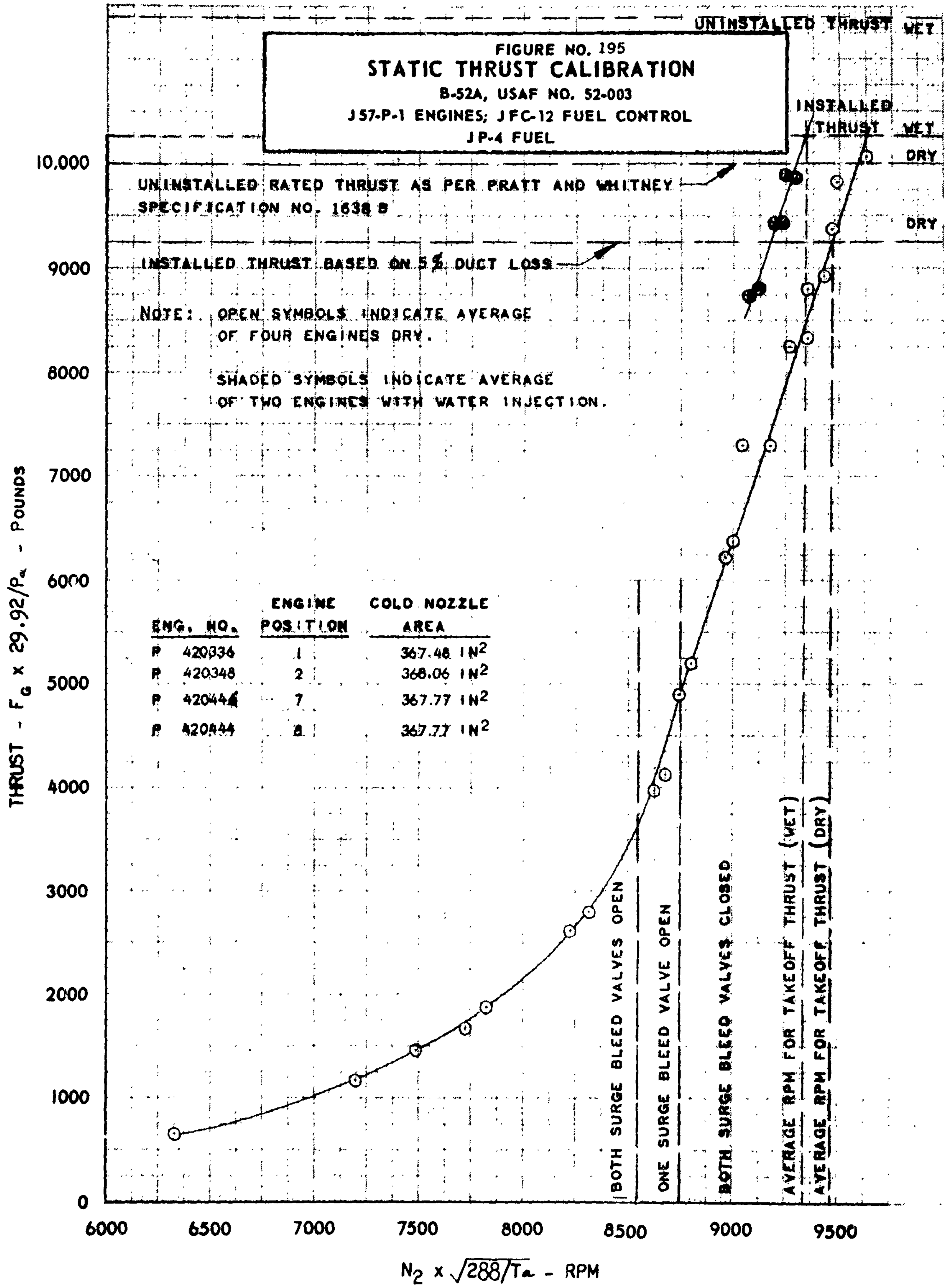
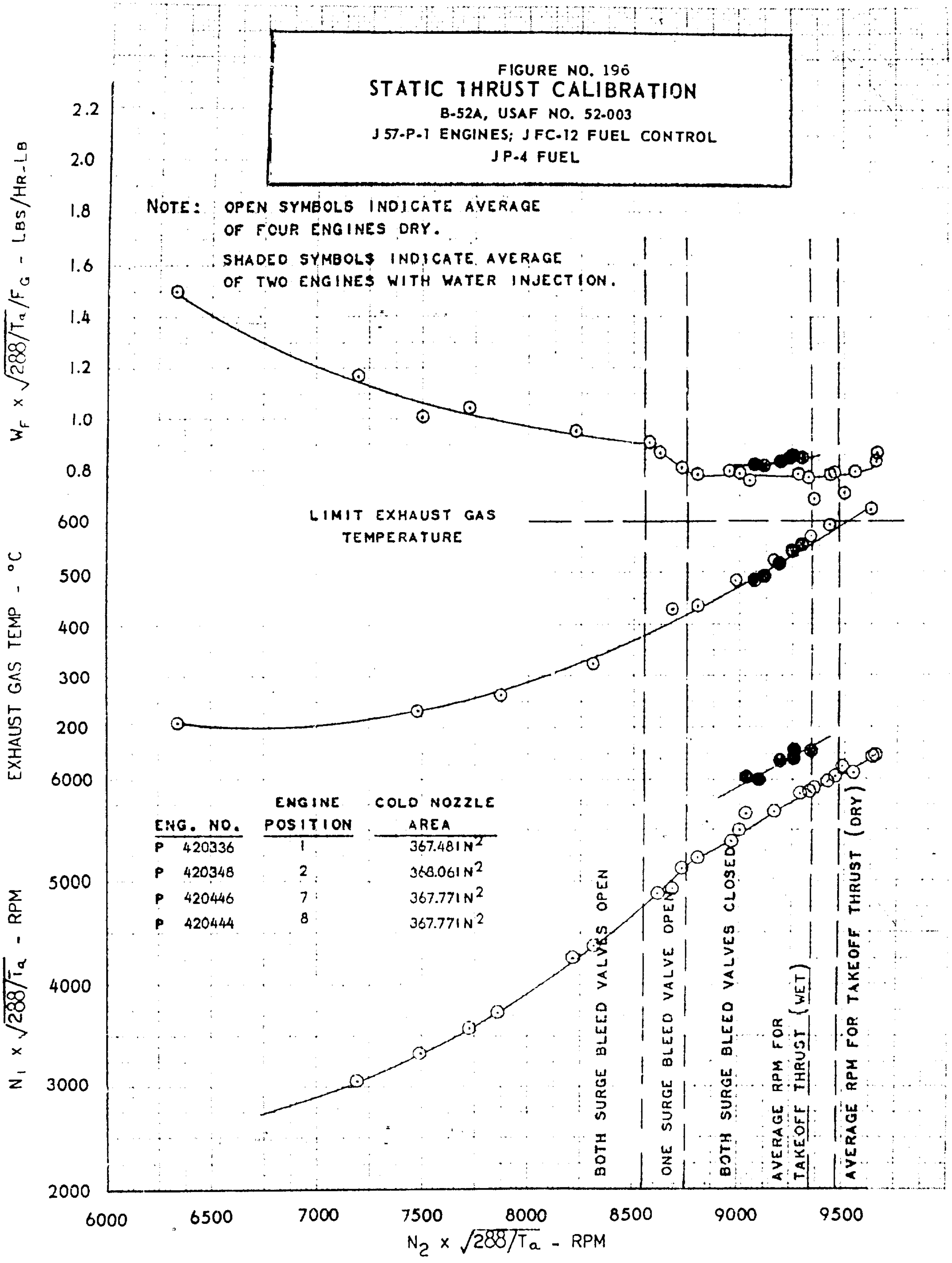


FIGURE NO. 195
STATIC THRUST CALIBRATION
B-52A, USAF NO. 52-003
J57-P-1 ENGINES; JFC-12 FUEL CONTROL
JP-4 FUEL
UNINSTALLED THRUST WET
INSTALLED THRUST WET
DRY
DRY
UNINSTALLED RATED THRUST AS PER PRATT AND WHITNEY SPECIFICATION NO. 1638 B
INSTALLED THRUST BASED ON 5% DUCT LOSS
NOTE: OPEN SYMBOLS INDICATE AVERAGE OF FOUR ENGINES DRY.
SHADED SYMBOLS INDICATE AVERAGE OF TWO ENGINES WITH WATER INJECTION.
ENG. NO. | ENGINE POSITION | COLD NOZZLE AREA
P 420336 | 1 | 367.48 IN²
P 420348 | 2 | 368.06 IN²
P 420444 | 7 | 367.77 IN²
P 420444 | 8 | 367.77 IN²
BOTH SURGE BLEED VALVES OPEN
ONE SURGE BLEED VALVE OPEN
BOTH SURGE BLEED VALVES CLOSED
AVERAGE RPM FOR TAKEOFF THRUST (WET)
AVERAGE RPM FOR TAKEOFF THRUST (DRY)
THRUST - F_G x 29.92/P_a - POUNDS
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10,000
6000
6500
7000
7500
8000
8500
9000
9500
N_2 x √(288/T_a) - RPM



ENG. NO.	ENGINE POSITION	COLD NOZZLE AREA
P 420336	1	367.48 IN^2
P 420348	2	368.06 IN^2
P 420446	7	367.77 IN^2
P 420444	8	367.77 IN^2

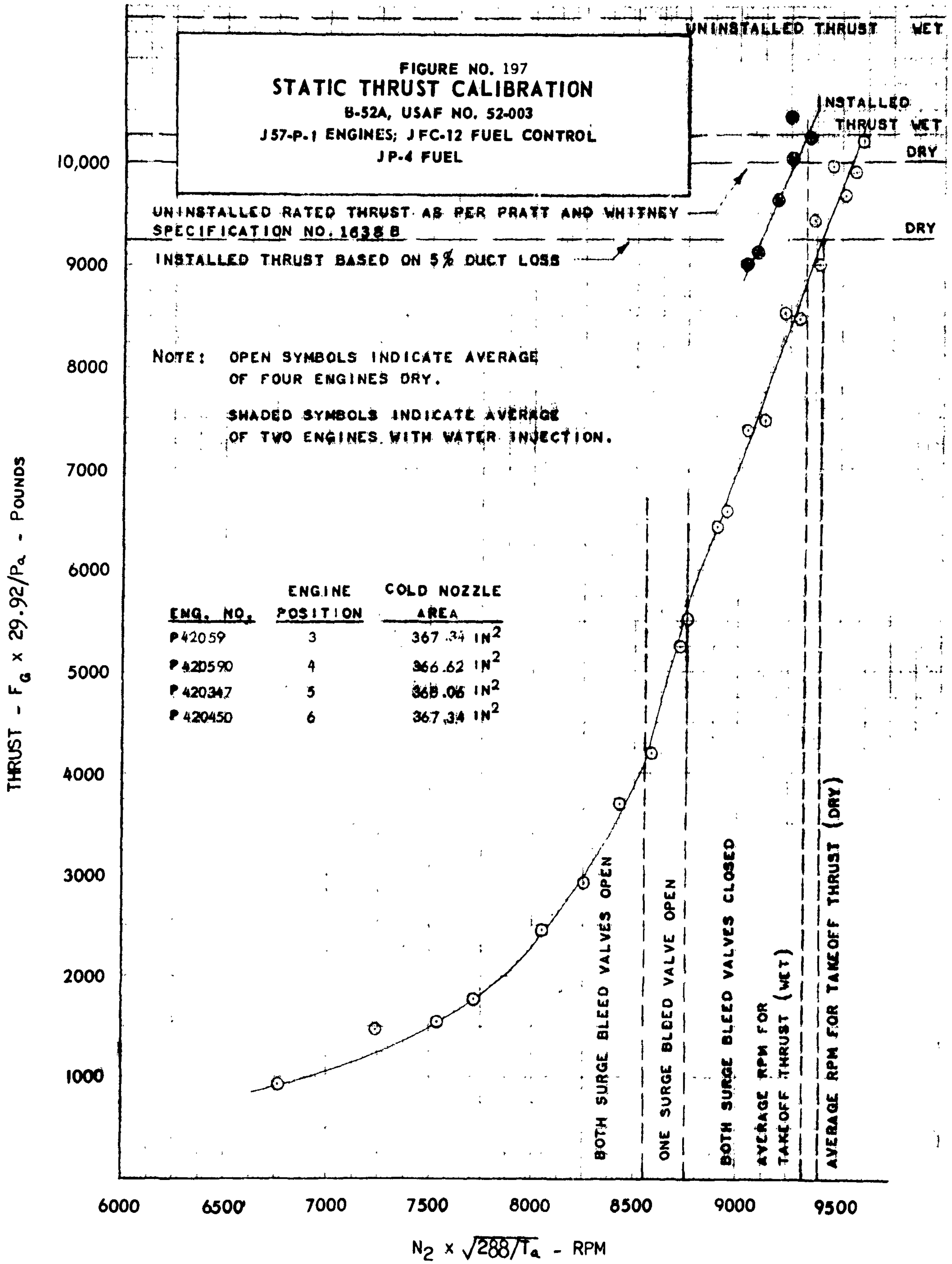


FIGURE NO. 197
STATIC THRUST CALIBRATION
B-52A, USAF NO. 52-003
J57-P-1 ENGINES; JFC-12 FUEL CONTROL
JP-4 FUEL
UNINSTALLED THRUST WET
INSTALLED THRUST WET
DRY
DRY
UNINSTALLED RATED THRUST AS PER PRATT AND WHITNEY SPECIFICATION NO. 1638 B
INSTALLED THRUST BASED ON 5% DUCT LOSS
NOTE: OPEN SYMBOLS INDICATE AVERAGE OF FOUR ENGINES DRY.
SHADED SYMBOLS INDICATE AVERAGE OF TWO ENGINES WITH WATER INJECTION.
ENG. NO.
ENGINE POSITION
COLD NOZZLE AREA
P42059 3 367.34 IN2
P420590 4 366.62 IN2
P420347 5 368.06 IN2
P420450 6 367.34 IN2
BOTH SURGE BLEED VALVES OPEN
ONE SURGE BLEED VALVE OPEN
BOTH SURGE BLEED VALVES CLOSED
AVERAGE RPM FOR TAKEOFF THRUST (WET)
AVERAGE RPM FOR TAKEOFF THRUST (DRY)
THRUST - FG x 29.92/Pa - POUNDS
1000
2000
3000
4000
5000
6000
7000
8000
9000
10,000
6000
6500
7000
7500
8000
8500
9000
9500
N2 x √288/Ta - RPM

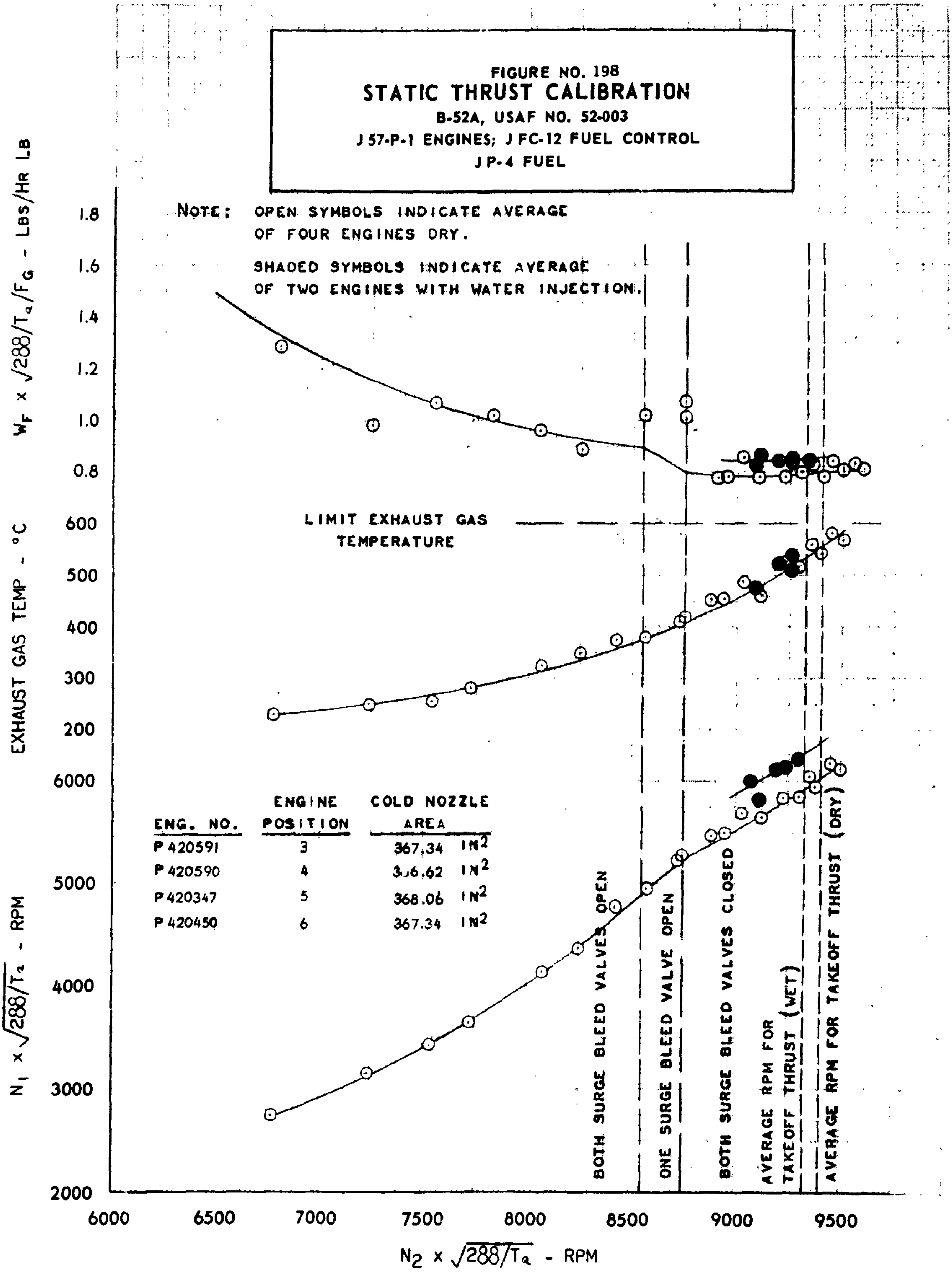


FIGURE NO. 198
STATIC THRUST CALIBRATION
B-52A, USAF NO. 52-003
J 57-P-1 ENGINES; J FC-12 FUEL CONTROL
J P-4 FUEL
NOTE: OPEN SYMBOLS INDICATE AVERAGE OF FOUR ENGINES DRY.
SHADED SYMBOLS INDICATE AVERAGE OF TWO ENGINES WITH WATER INJECTION.
$W_F \times \sqrt{288/T_a}/F_G$ - LBS/HR LB
1.8
1.6
1.4
1.2
1.0
0.8
LIMIT EXHAUST GAS TEMPERATURE
EXHAUST GAS TEMP - °C
600
500
400
300
200
$N_1 \times \sqrt{288/T_2}$ - RPM
6000
5000
4000
3000
2000
ENG. NO. | ENGINE POSITION | COLD NOZZLE AREA
P 420591 | 3 | 367.34 IN^2
P 420590 | 4 | 3∪6.62 IN^2
P 420347 | 5 | 368.06 IN^2
P 420450 | 6 | 367.34 IN^2
BOTH SURGE BLEED VALVES OPEN
ONE SURGE BLEED VALVE OPEN
BOTH SURGE BLEED VALVES CLOSED
AVERAGE RPM FOR TAKEOFF THRUST (WET)
AVERAGE RPM FOR TAKEOFF THRUST (DRY)
6000
6500
7000
7500
8000
8500
9000
9500
$N_2 \times \sqrt{288/T_a}$ - RPM

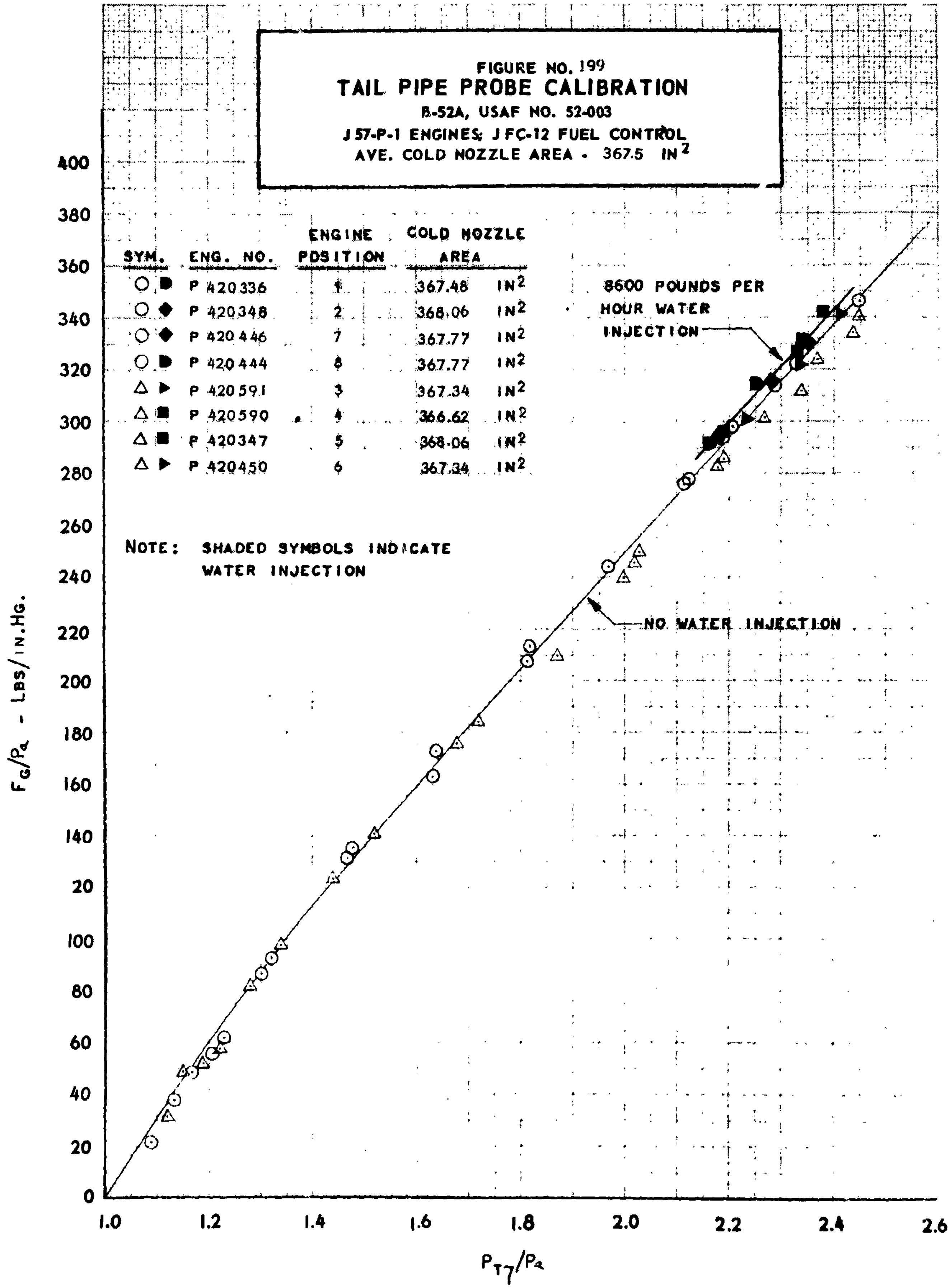


FIGURE NO. 199
TAIL PIPE PROBE CALIBRATION
B-52A, USAF NO. 52-003
J 57-P-1 ENGINES; J FC-12 FUEL CONTROL
AVE. COLD NOZZLE AREA - 367.5 IN²
SYM. | ENG. NO. | ENGINE POSITION | COLD NOZZLE AREA
P 420336 | 1 | 367.48 IN²
P 420348 | 2 | 368.06 IN²
P 420446 | 7 | 367.77 IN²
P 420444 | 8 | 367.77 IN²
P 420591 | 3 | 367.34 IN²
P 420590 | 4 | 366.62 IN²
P 420347 | 5 | 368.06 IN²
P 420450 | 6 | 367.34 IN²
NOTE: SHADED SYMBOLS INDICATE WATER INJECTION
8600 POUNDS PER HOUR WATER INJECTION
NO WATER INJECTION
F_G/P_a - LBS/IN.HG.
P_T7/P_a
0
20
40
60
80
100
20
140
160
180
200
220
240
260
280
300
320
340
360
380
400
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6

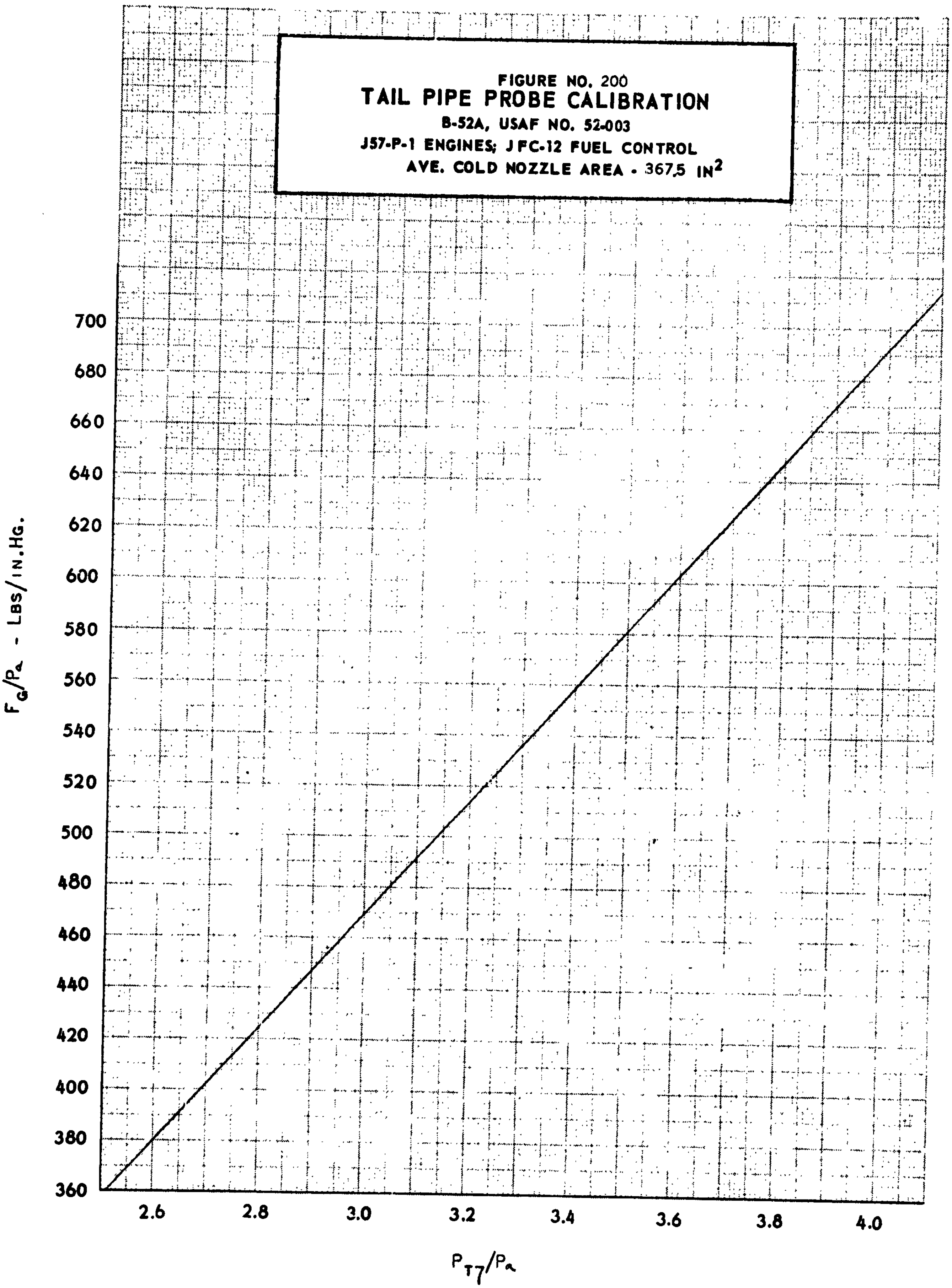


FIGURE NO. 200
TAIL PIPE PROBE CALIBRATION
B-52A, USAF NO. 52-003
J57-P-1 ENGINES; JFC-12 FUEL CONTROL
AVE. COLD NOZZLE AREA - 367.5 IN²
F_G/P_a - LBS/IN.HG.
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
380
360
2.6
2.8
3.0
3.2
3.4
3.6
3.8
4.0
P_{T7}/P_a

FIGURE NO. 201
TAIL PIPE PROBE CALIBRATION
B-52A, USAF NO. 52-003
J57-P-1 ENGINES; JFC-12 FUEL CONTROL
AVE. COLD NOZZLE AREA - 367.5 IN^2

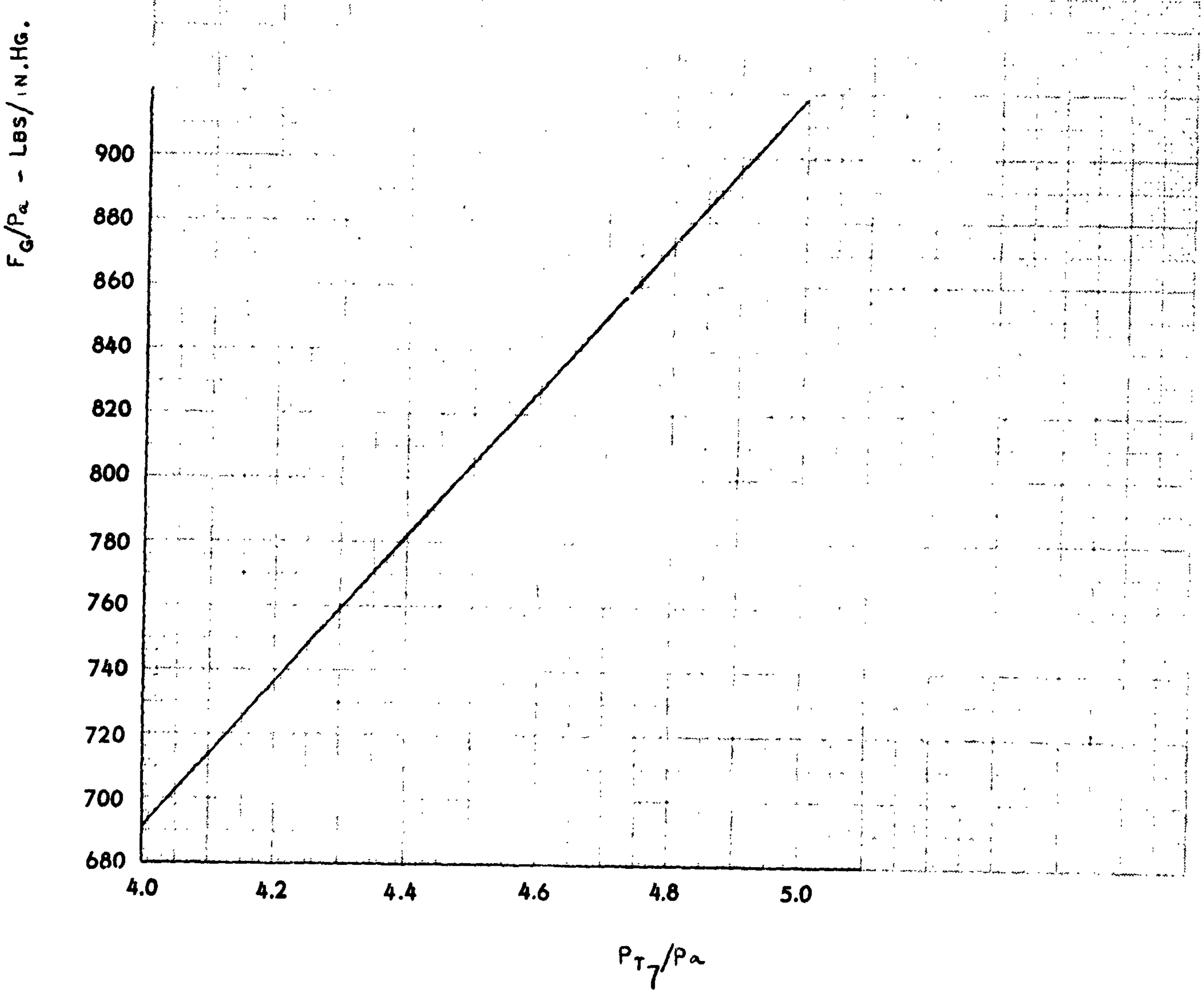


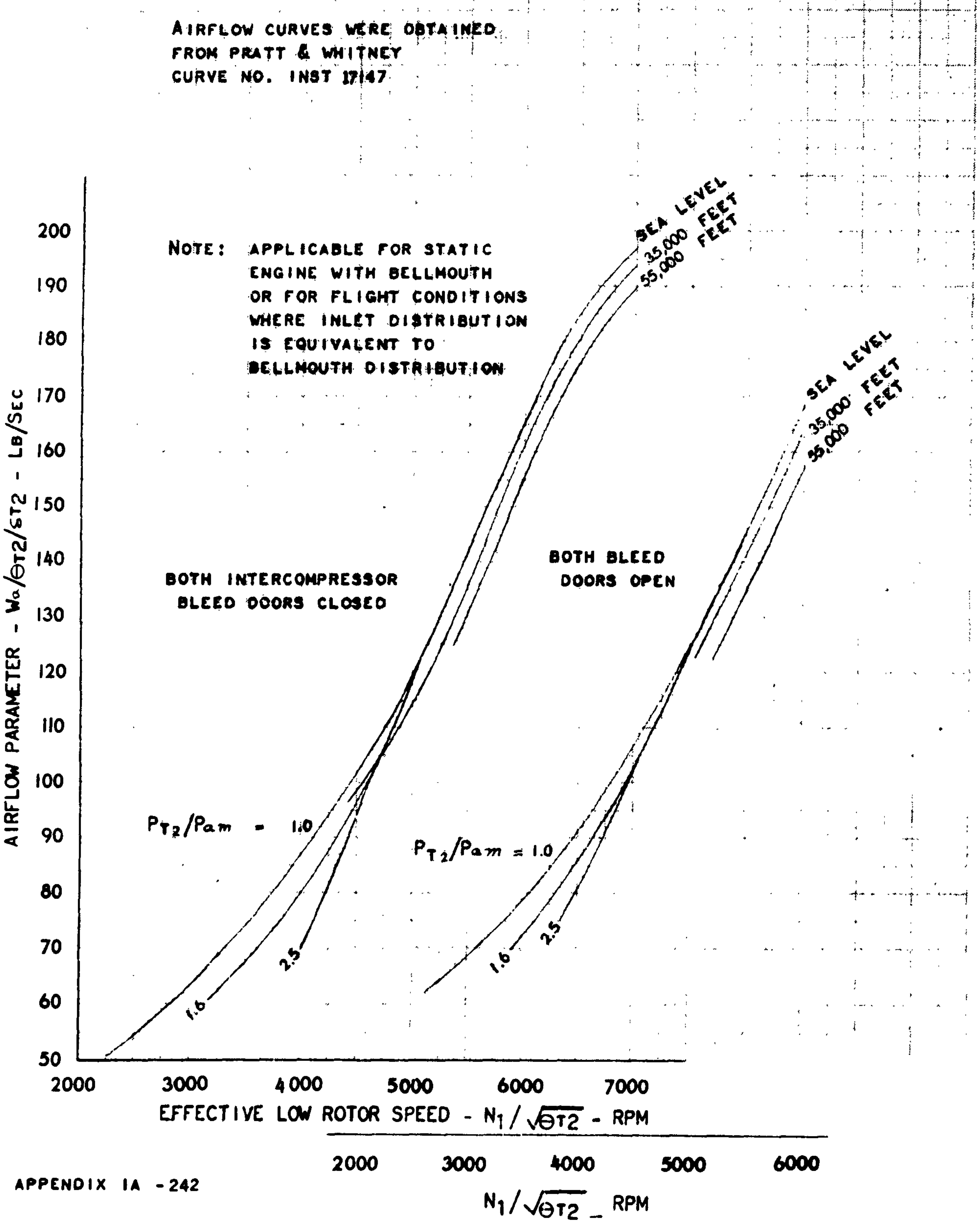
FIGURE NO. 202

CONTRACTOR ESTIMATED AIRFLOW

J57-P-1 ENGINE

FIXED COLD NOZZLE AREA 367.5 IN^2

HIGH PRESSURE COMPRESSOR BLEEDS CLOSED



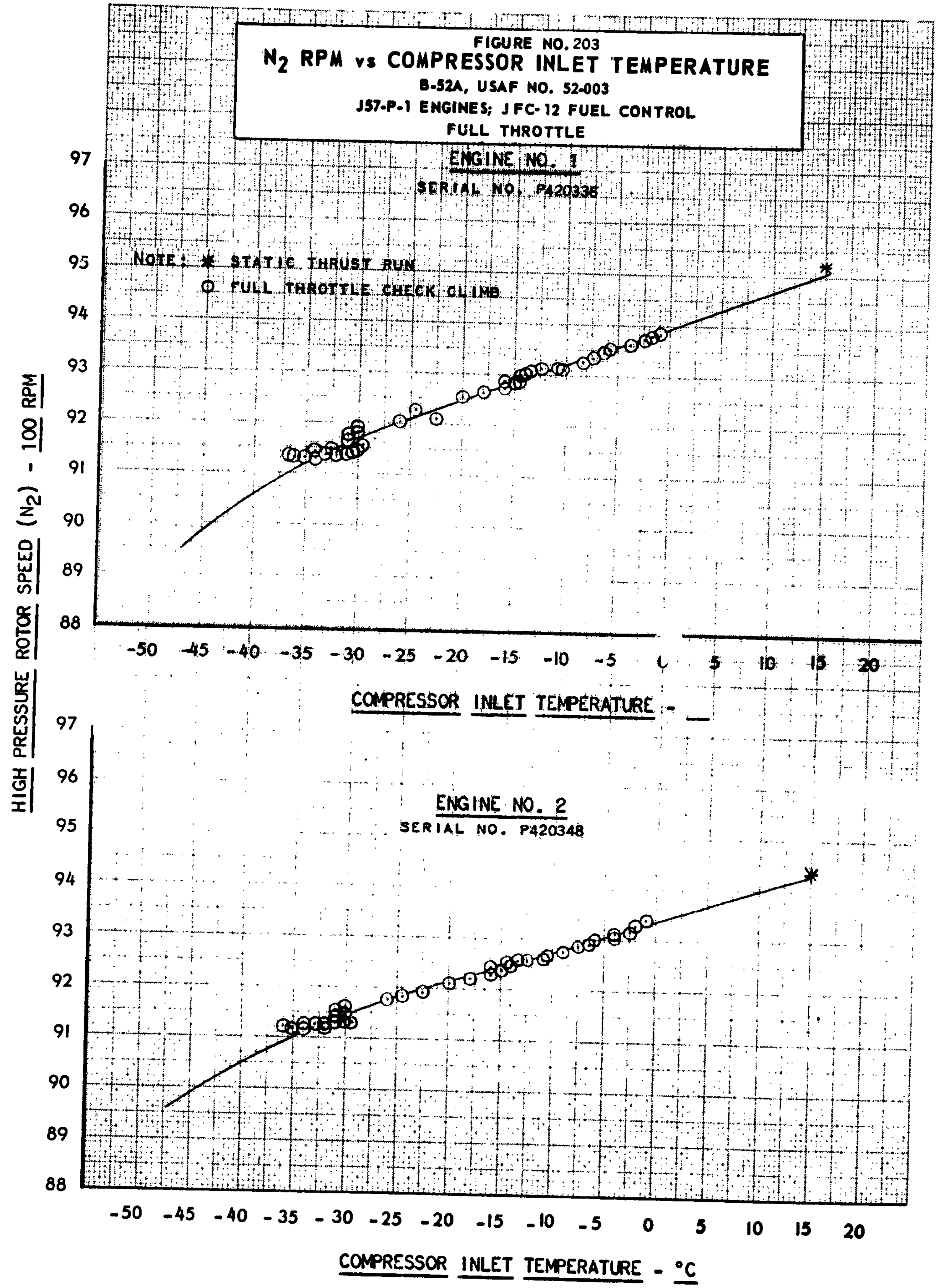


FIGURE NO. 203
N_2 RPM vs COMPRESSOR INLET TEMPERATURE
B-52A, USAF NO. 52-003
J57-P-1 ENGINES; JFC-12 FUEL CONTROL
FULL THROTTLE
ENGINE NO. 1
SERIAL NO. P420336
NOTE: * STATIC THRUST RUN
O FULL THROTTLE CHECK CLIMB
HIGH PRESSURE ROTOR SPEED (N_2) - 100 RPM
97
96
95
94
93
92
91
90
89
88
-50 -45 -40 -35 -30 -25 -20 -15 -10 -5 0 5 10 15 20
COMPRESSOR INLET TEMPERATURE - __
ENGINE NO. 2
SERIAL NO. P420348
COMPRESSOR INLET TEMPERATURE - °C

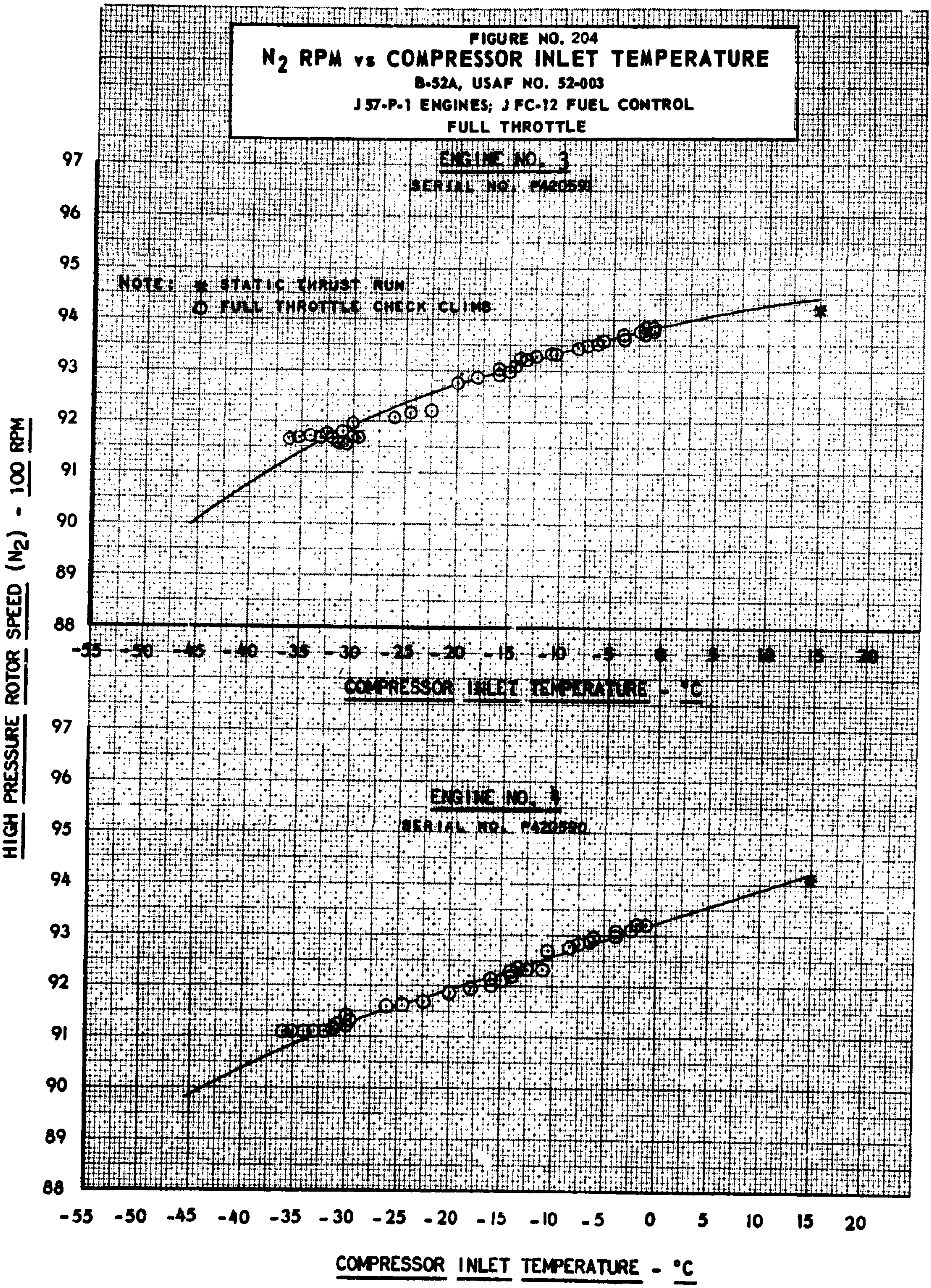


FIGURE NO. 204
N_2 RPM vs COMPRESSOR INLET TEMPERATURE
B-52A, USAF NO. 52-003
J 57-P-1 ENGINES; J FC-12 FUEL CONTROL
FULL THROTTLE

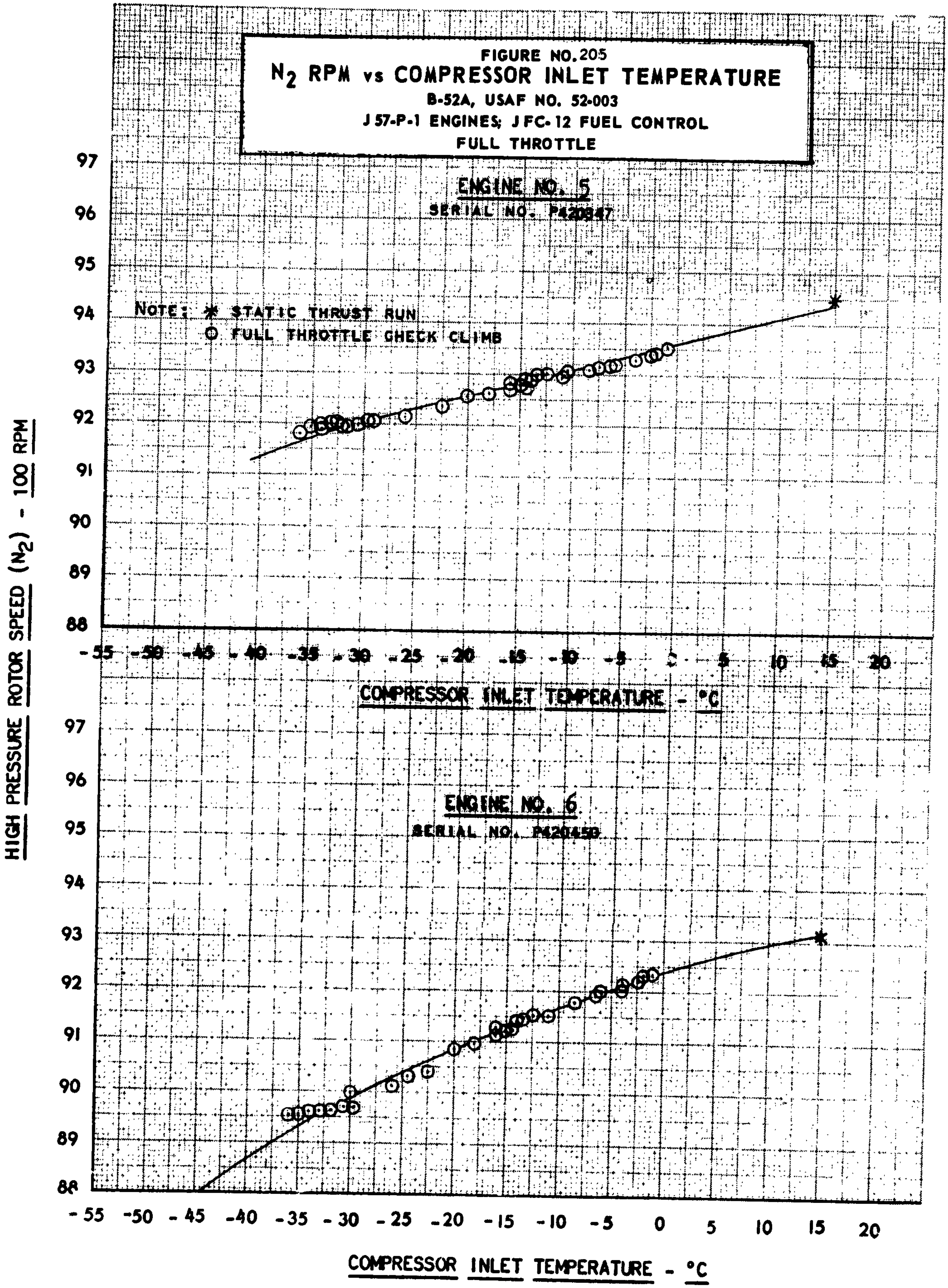


FIGURE NO. 205
N_2 RPM vs COMPRESSOR INLET TEMPERATURE
B-52A, USAF NO. 52-003
J 57-P-1 ENGINES; J FC-12 FUEL CONTROL
FULL THROTTLE
ENGINE NO. 5
SERIAL NO. P420847
NOTE: * STATIC THRUST RUN
O FULL THROTTLE CHECK CLIMB
ENGINE NO. 6
SERIAL NO. P420450
HIGH PRESSURE ROTOR SPEED (N_2) - 100 RPM
COMPRESSOR INLET TEMPERATURE - °C
97
96
95
94
93
92
91
90
89
88
-55
-50
-45
-40
-35
-30
-25
-20
-15
-10
-5
0
5
10
15
20

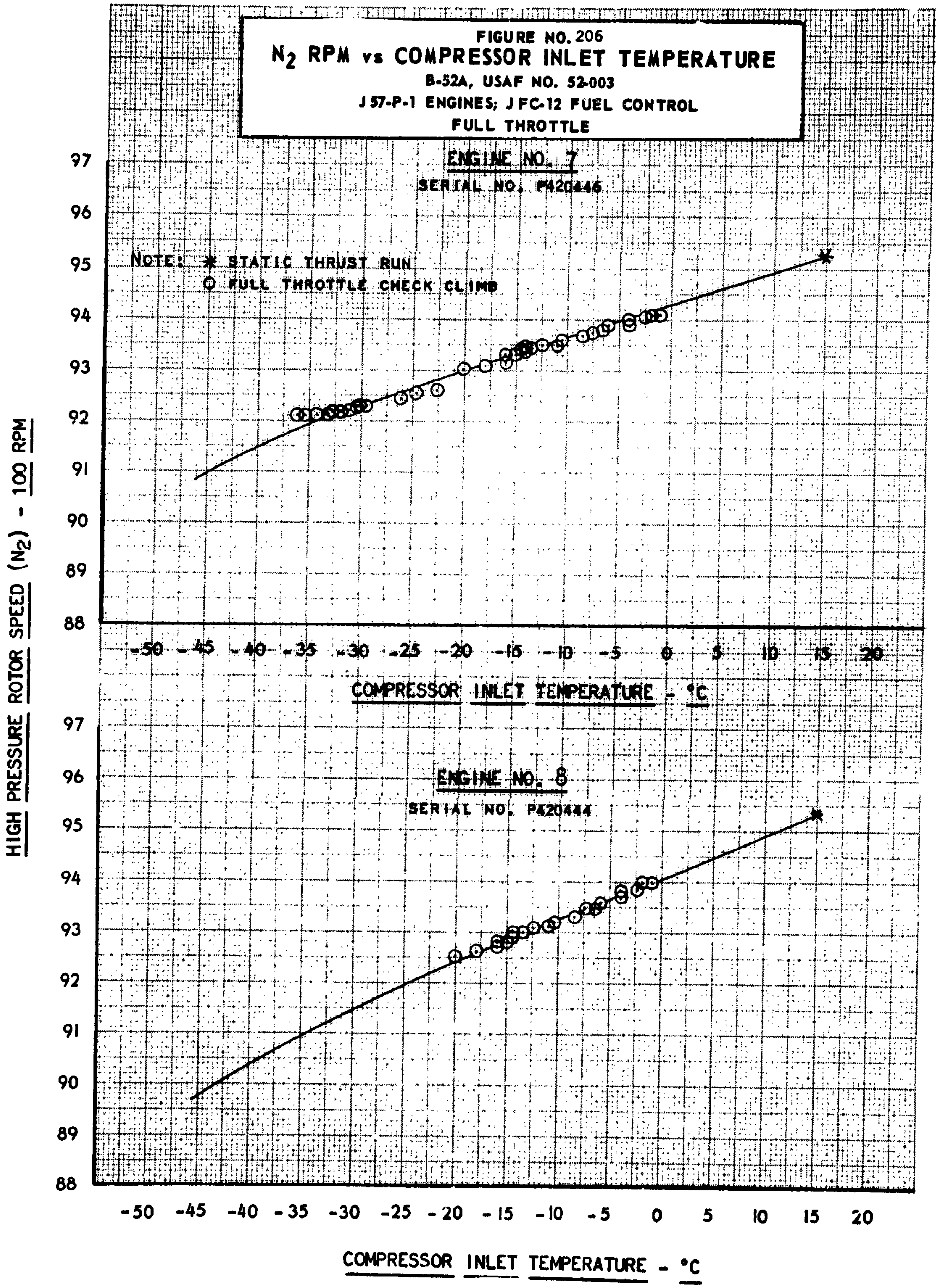


FIGURE NO. 206
N_2 RPM vs COMPRESSOR INLET TEMPERATURE
B-52A, USAF NO. 52-003
J 57-P-1 ENGINES; J FC-12 FUEL CONTROL
FULL THROTTLE
ENGINE NO. 7
SERIAL NO. P420446
NOTE: * STATIC THRUST RUN
O FULL THROTTLE CHECK CLIMB
ENGINE NO. 8
SERIAL NO. P420444
HIGH PRESSURE ROTOR SPEED (N_2) - 100 RPM
COMPRESSOR INLET TEMPERATURE - °C
COMPRESSOR INLET TEMPERATURE - °C
97
96
95
94
93
92
91
90
89
88
-50 -45 -40 -35 -30 -25 -20 -15 -10 -5 0 5 10 15 20

FIGURE NO. 207

N₂ RPM vs COMPRESSOR INLET TEMPERATURE

B-52A, USAF NO. 52-003

J57-P-1 ENGINES; JFC-12 FUEL CONTROL

FULL THROTTLE

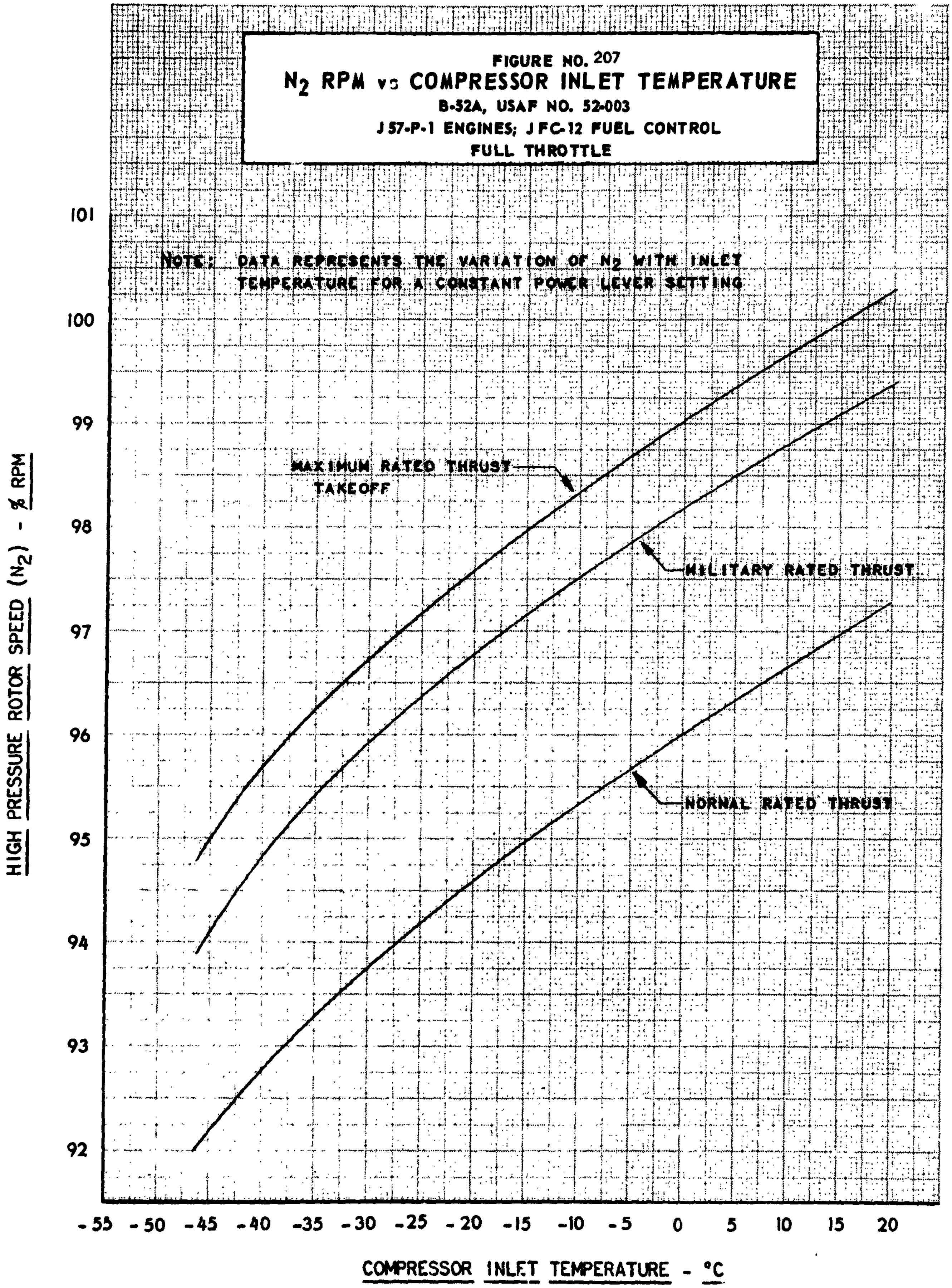
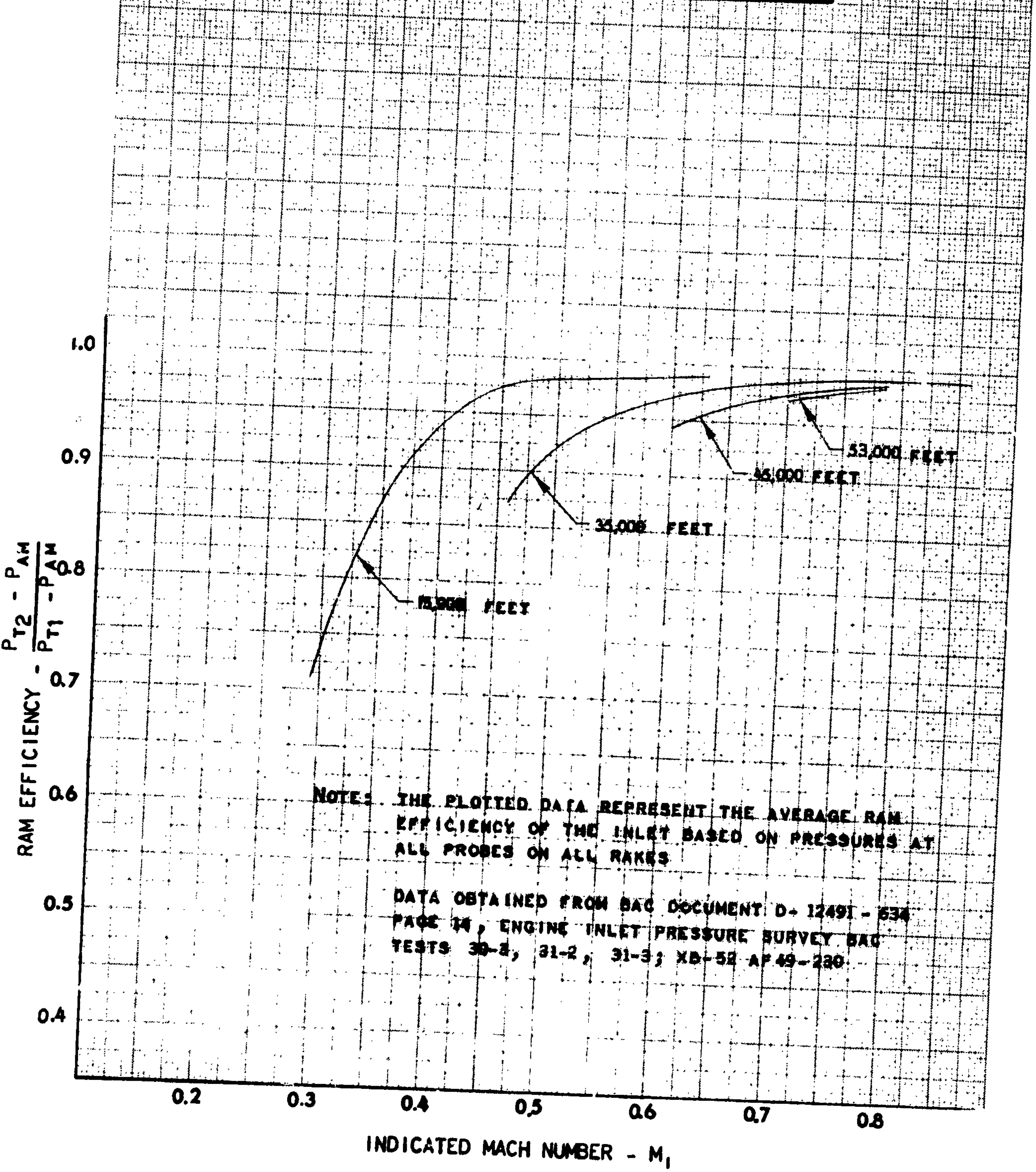


FIGURE NO. 208
ENGINE INLET DUCT EFFICIENCY
B-52A, USAF NO. 52-003
J 57-P-1 ENGINES



STABILITY

AND

CONTROL

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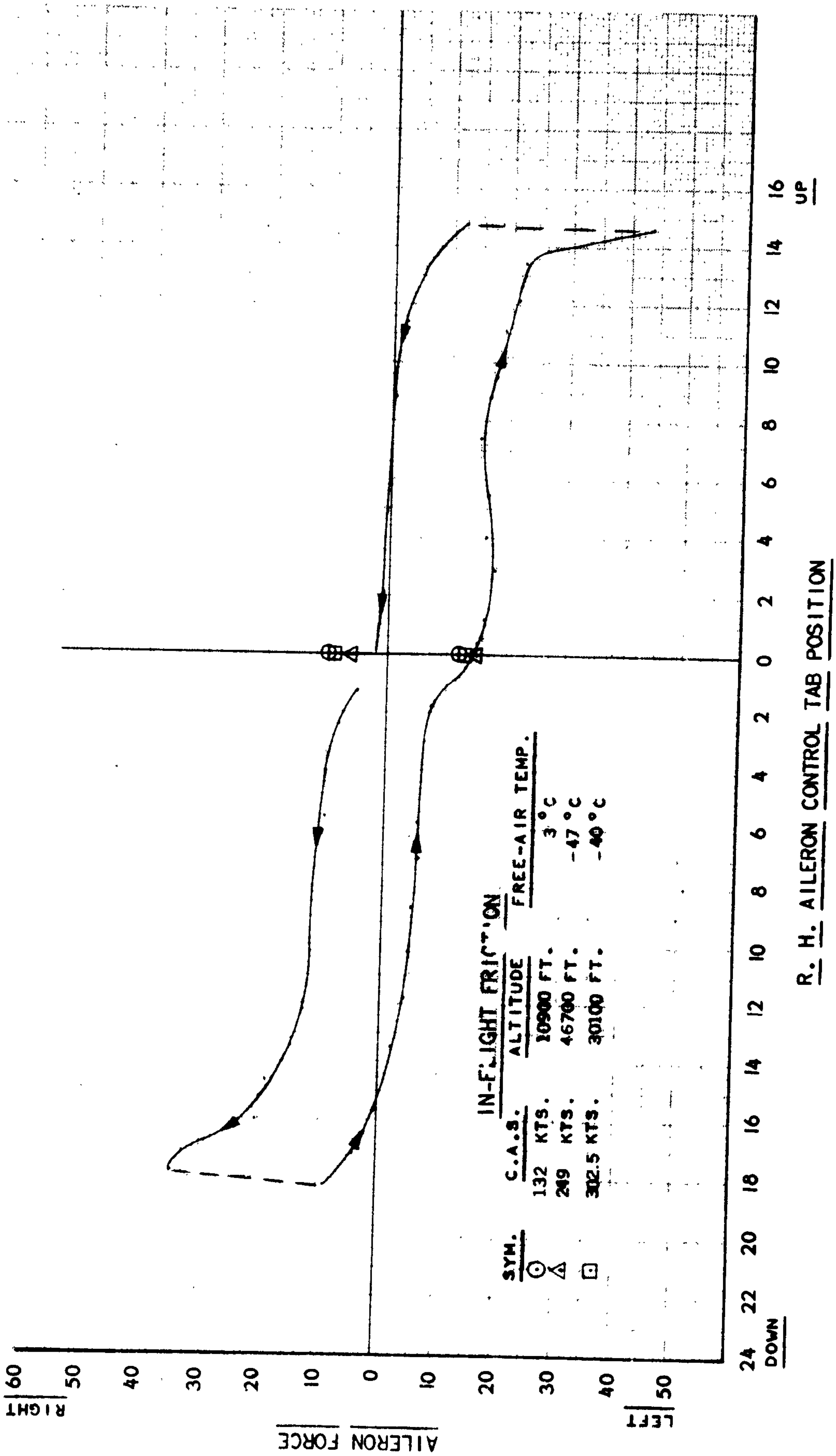
FOR CONVENIENCE OF

PRESENTING PLOTS

CONTROL FRICTION

FIGURE NO. 209
AILERON CONTROL TAB FRICTION
B-52A, USAF NO. 52-003
Wind – 10 Knots, Temp. 29°C.



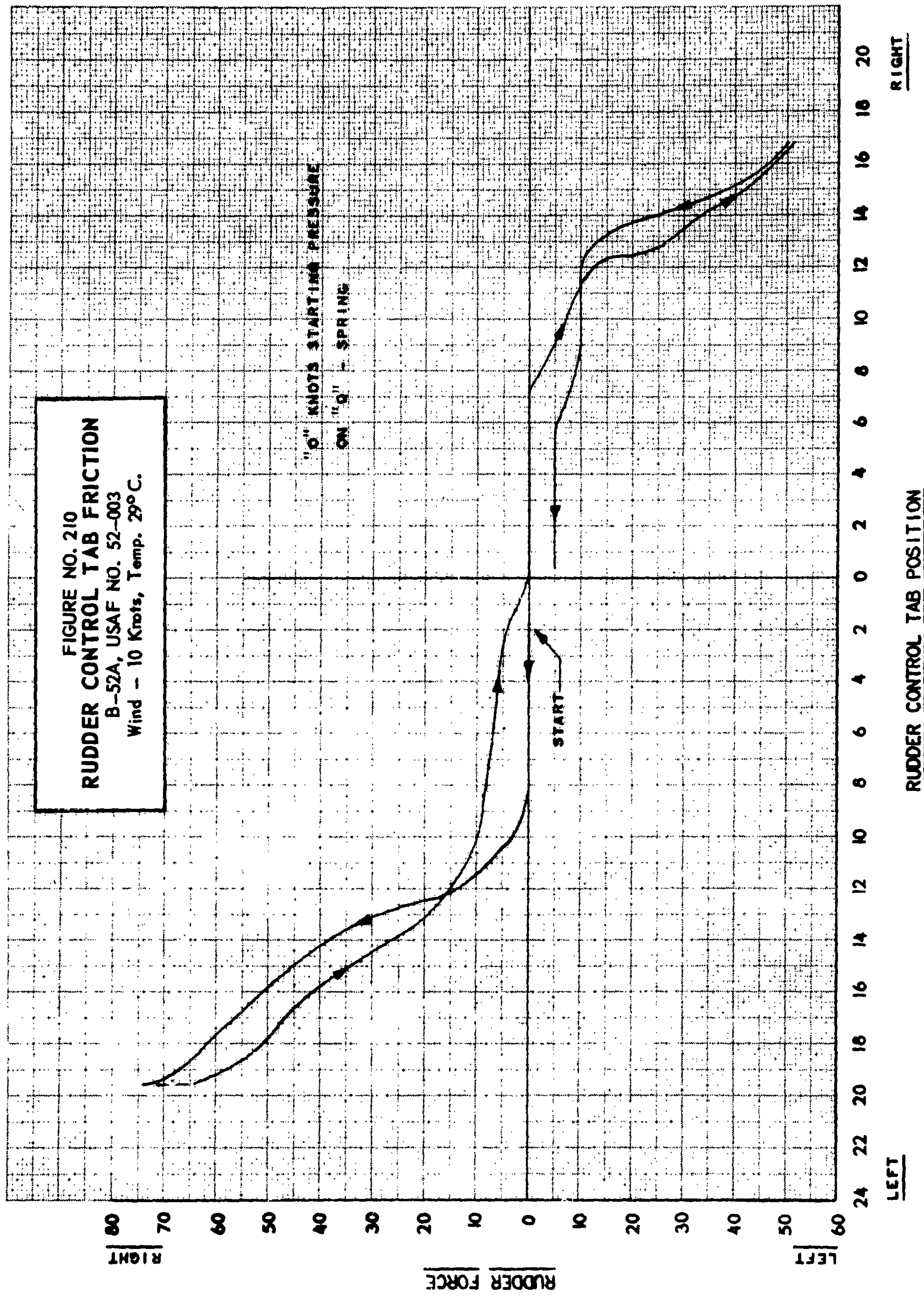


FIGURE NO. 210
RUDDER CONTROL TAB FRICTION
B-52A, USAF NO. 52-003
Wind - 10 Knots, Temp. 29°C.

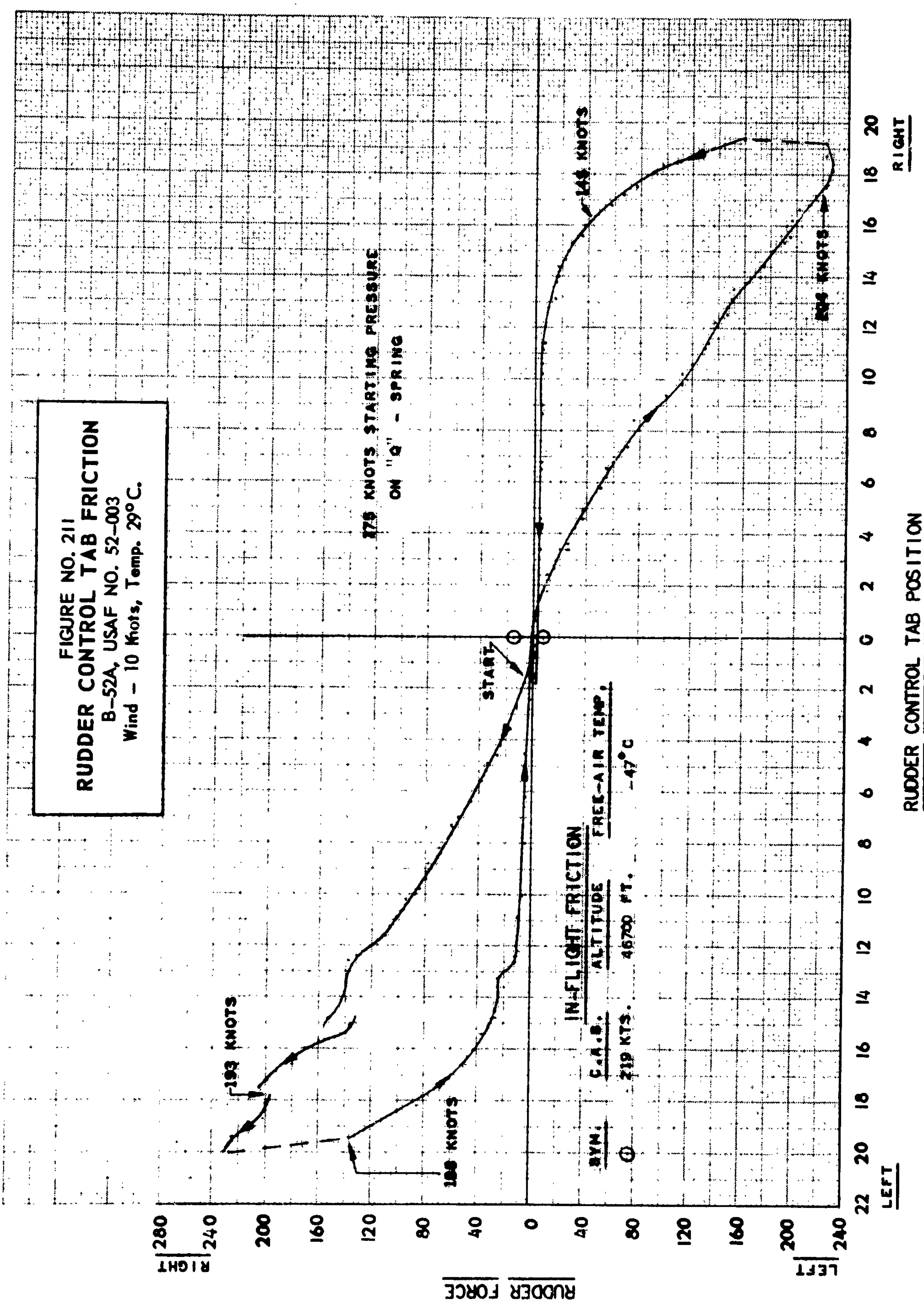


FIGURE NO. 211
RUDDER CONTROL TAB FRICTION
B-52A, USAF NO. 52-003
Wind - 10 Knots, Temp. 29°C.

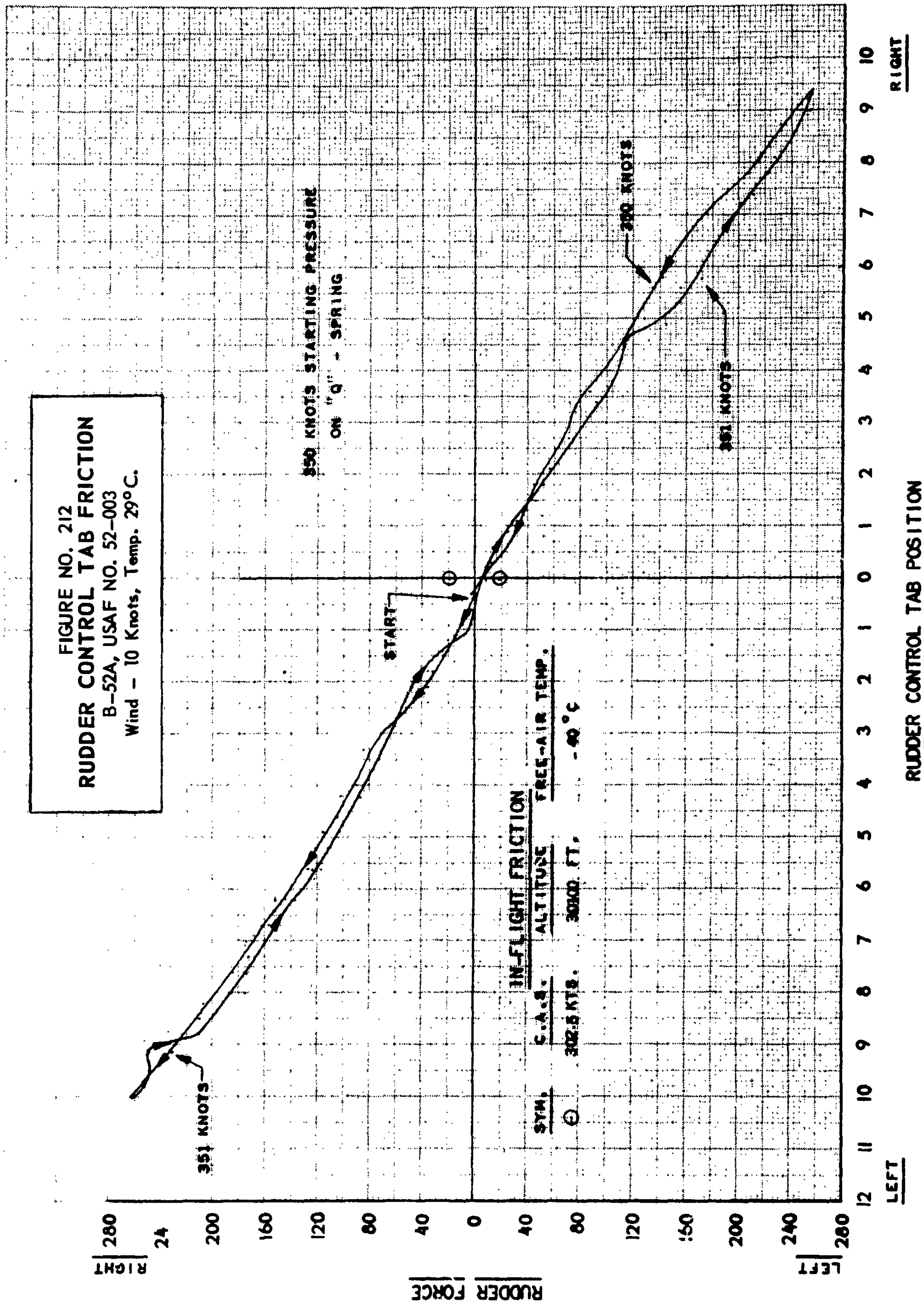


FIGURE NO. 212
RUDDER CONTROL TAB FRICTION
B-52A, USAF NO. 52-003
Wind - 10 Knots, Temp. 29°C.
350 KNOTS STARTING PRESSURE
ON "Q" - SPRING
380 KNOTS
351 KNOTS
START
IN-FLIGHT FRICTION
SYM. C.A.S. ALTITUDE FREE-AIR TEMP.
302.5 KTS. 30000 FT. -40°C
RUDDER CONTROL TAB POSITION
RIGHT
LEFT
RUDDER FORCE

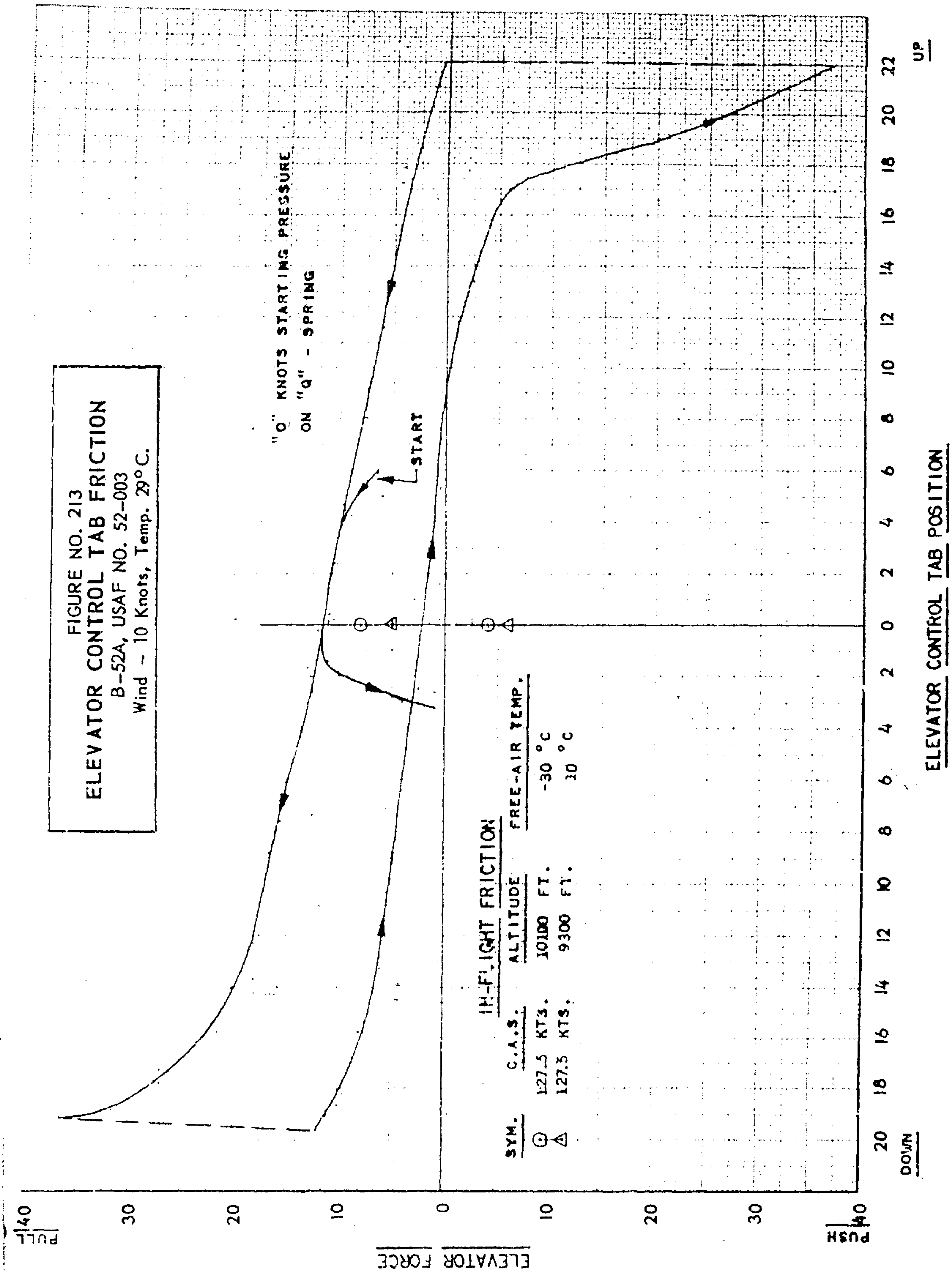


FIGURE NO. 213
ELEVATOR CONTROL TAB FRICTION
B-52A, USAF NO. 52-003
Wind – 10 Knots, Temp. 29°C.

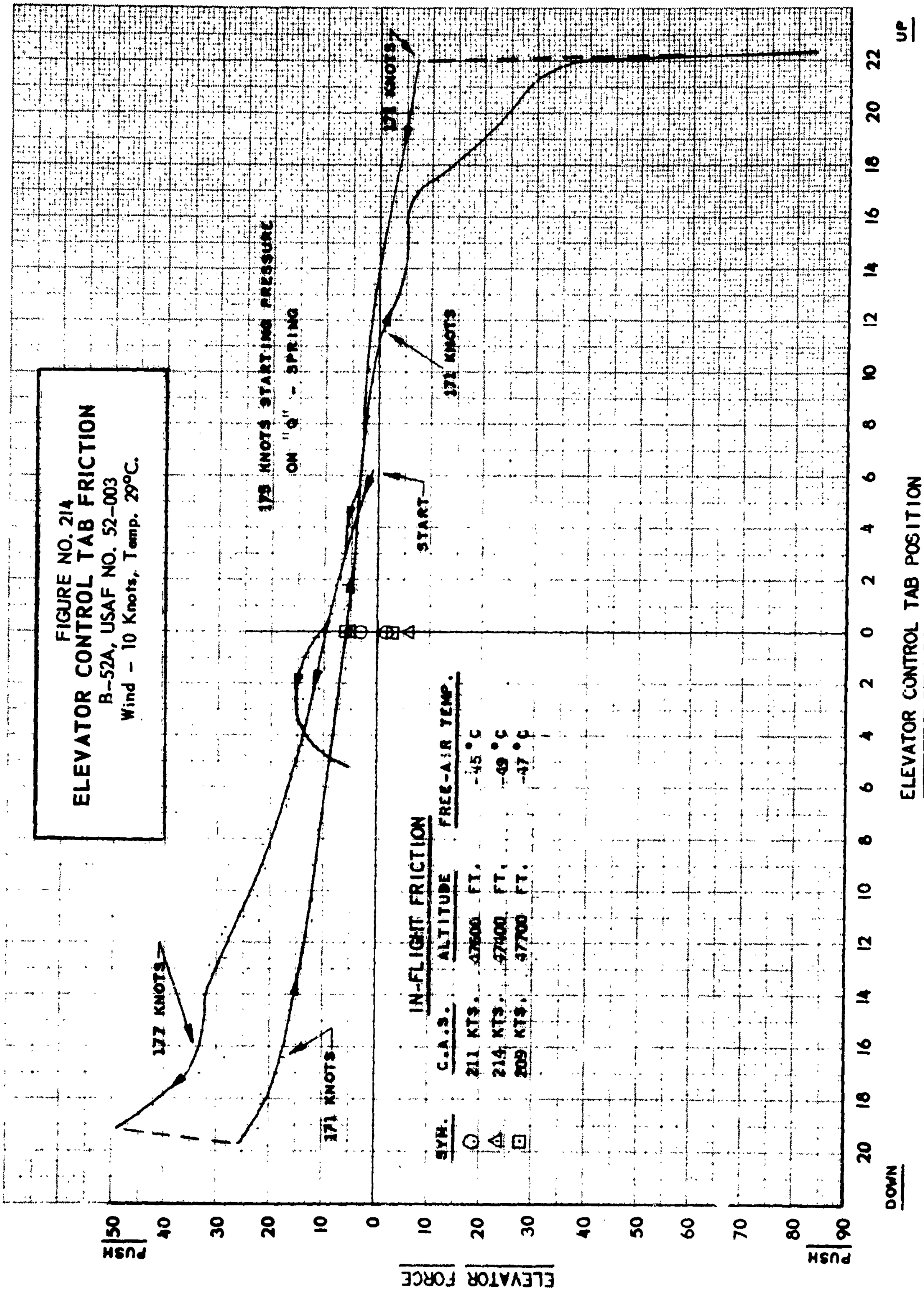


FIGURE NO. 214
ELEVATOR CONTROL TAB FRICTION
B-52A, USAF NO. 52-003
Wind - 10 Knots, Temp. 29°C.

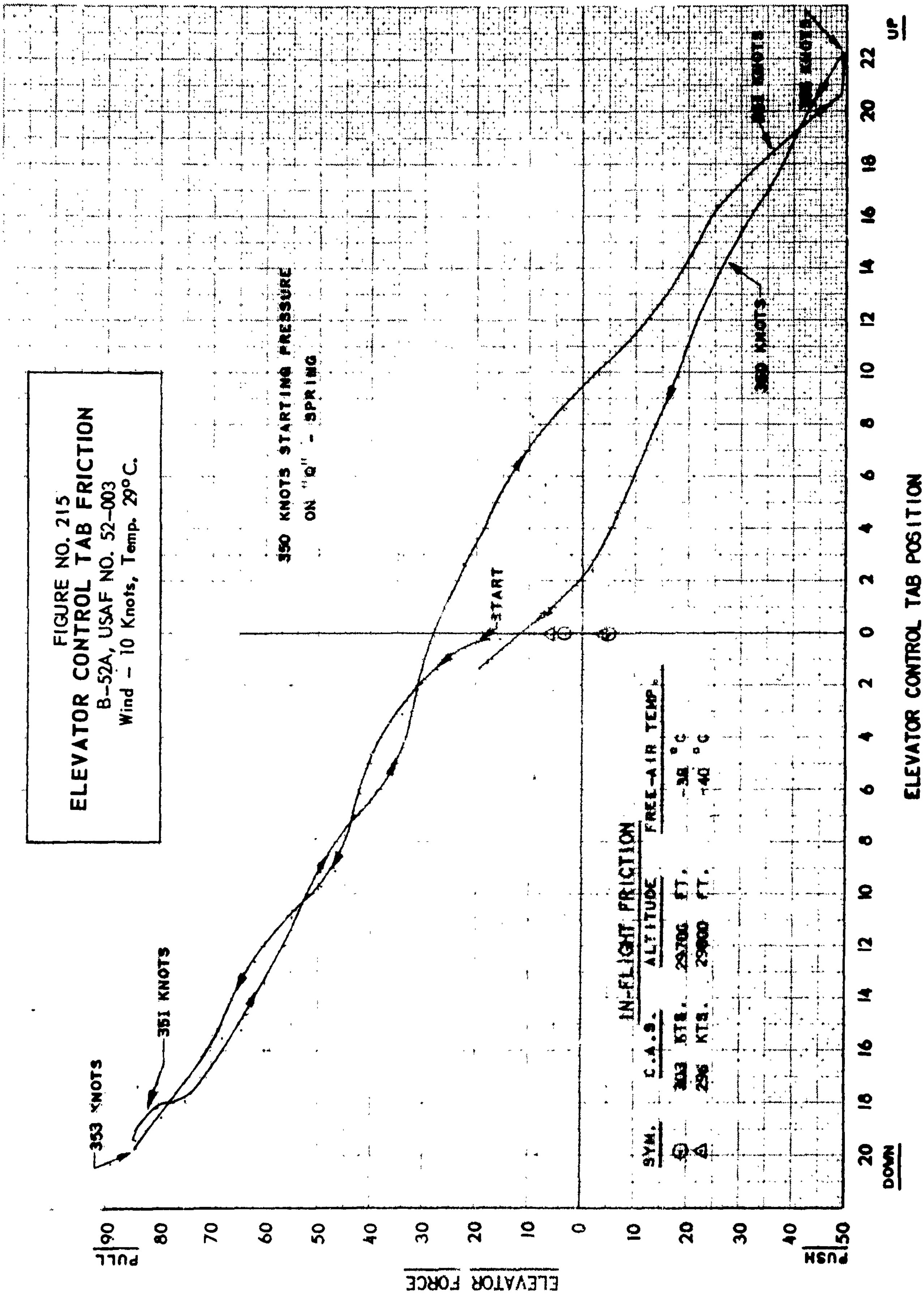


FIGURE NO. 215
ELEVATOR CONTROL TAB FRICTION
B-52A, USAF NO. 52-003
Wind – 10 Knots, Temp. 29°C.

TAKEOFFS

FIGURE NO. 216

TAKEOFF TIME HISTORY

B-52A USAF NO. 52-003
TAKEOFF CONFIGURATION

TRIM CONDITIONS

ALTITUDE SEA LEVEL FLAPS DOWN
C.G. 22.15 % MAC; WEIGHT 378,000 LBS.
AVG. N2 9460 RPM; STABILIZER POSITION 3.3 DEG. N.U.

NO EXTERNAL TANKS INSTALLED

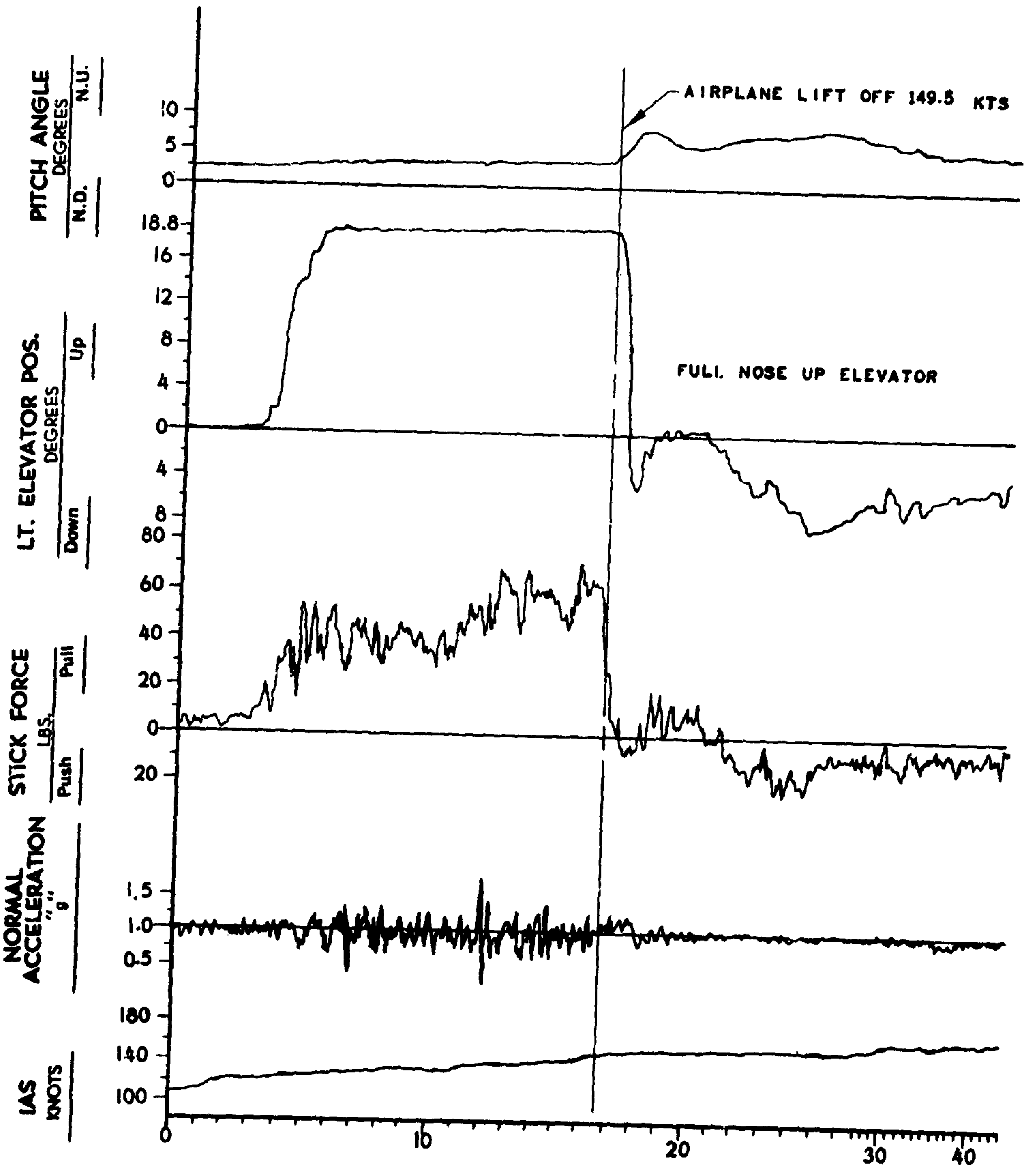


FIGURE NO. 217

TAKEOFF TIME HISTORY

B-52A USAF NO. 52-003
TAKEOFF CONFIGURATION

TRIM CONDITIONS

ALTITUDE	SEA LEVEL	FLAPS	Down
C.G.	25.68 % MAC;	WEIGHT	378 000 LBS.
AVG. N2	9410 RPM;	STABILIZER POSITION	2.2 DEG. N.U.

NO EXTERNAL TANKS INSTALLED

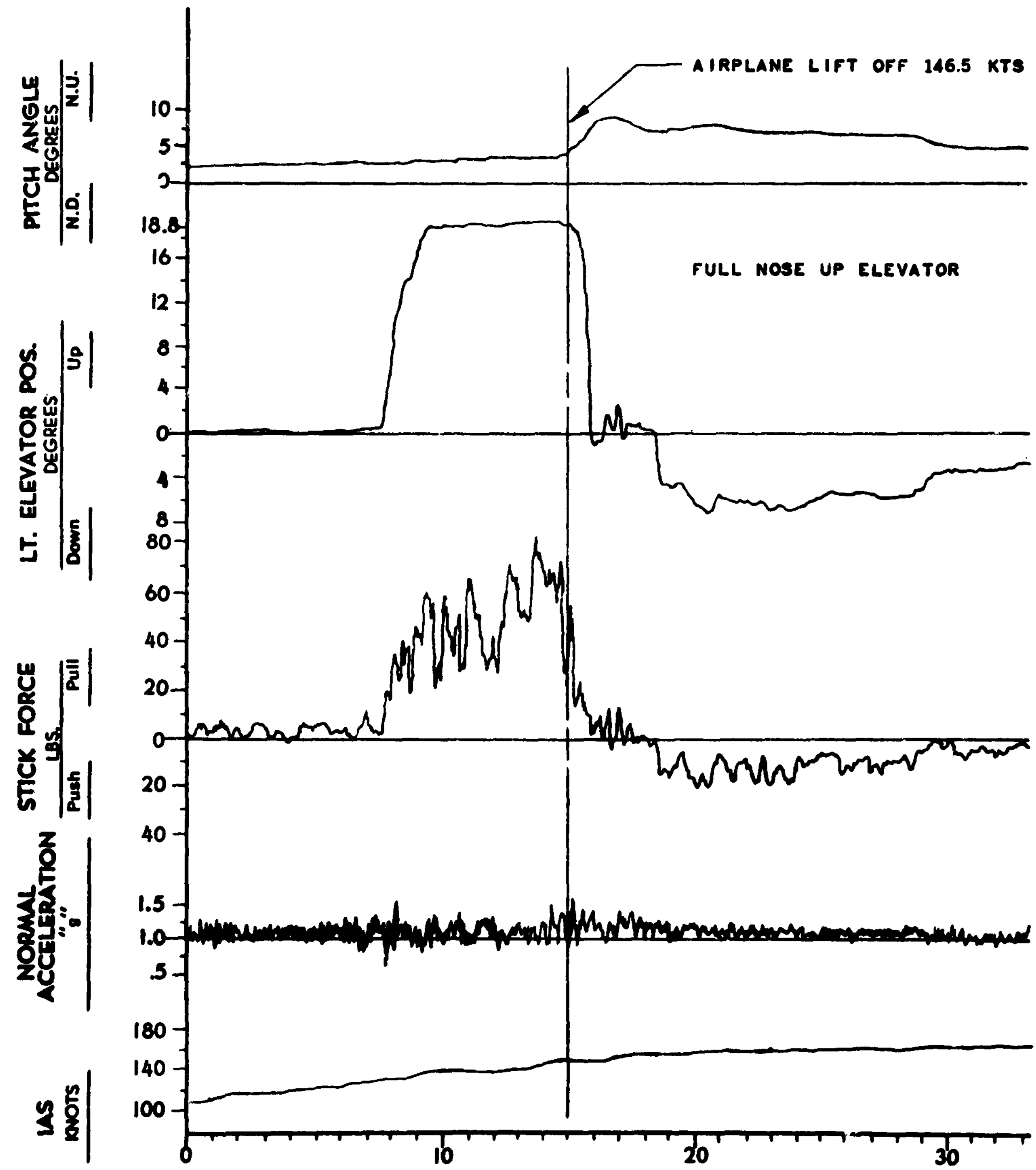


FIGURE NO. 218

TAKEOFF TIME HISTORY

B-52A USAF NO. 52-003
TAKEOFF CONFIGURATION

TRIM CONDITIONS

ALTITUDE SEA LEVEL FLAPS Down
C.G. 32.28 % MAC; WEIGHT 363,000 LBS.
AVG. N2 9410 RPM; STABILIZER POSITION 0.2 DEG. N.U.

NO EXTERNAL TANKS INSTALLED

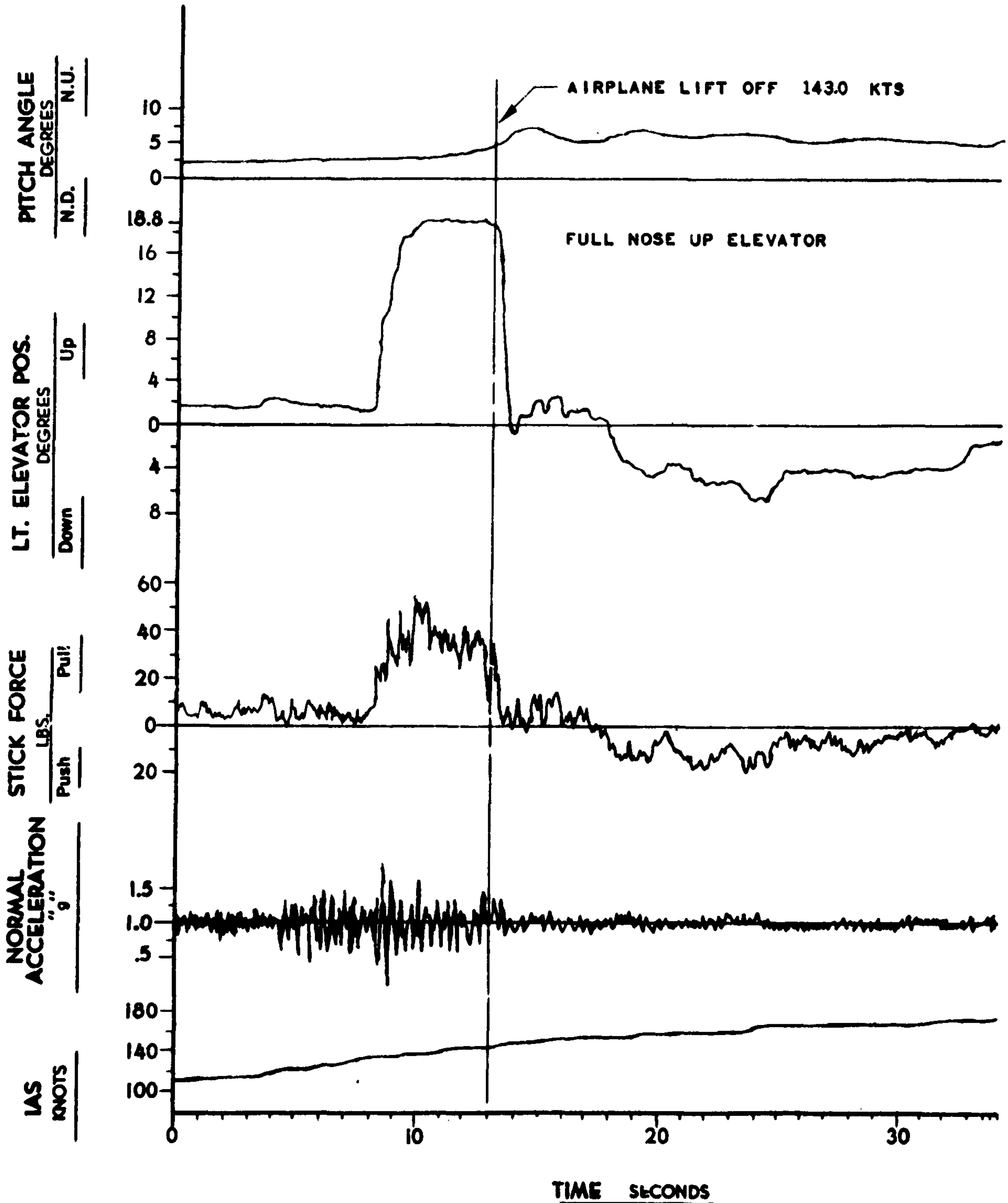


FIGURE NO. 219

TAKEOFF TIME HISTORY

B-52A USAF NO. 52-003
TAKEOFF CONFIGURATION

TRIM CONDITIONS

ALTITUDE	SEA LEVEL	FLAPS	DOWN
C.G.	26.69 % MAC;	WEIGHT	404,000 LBS.
AVG. N_2	9360 RPM;	STABILIZER POSITION	1.5 DEG. N.U.

EXTERNAL TANKS INSTALLED

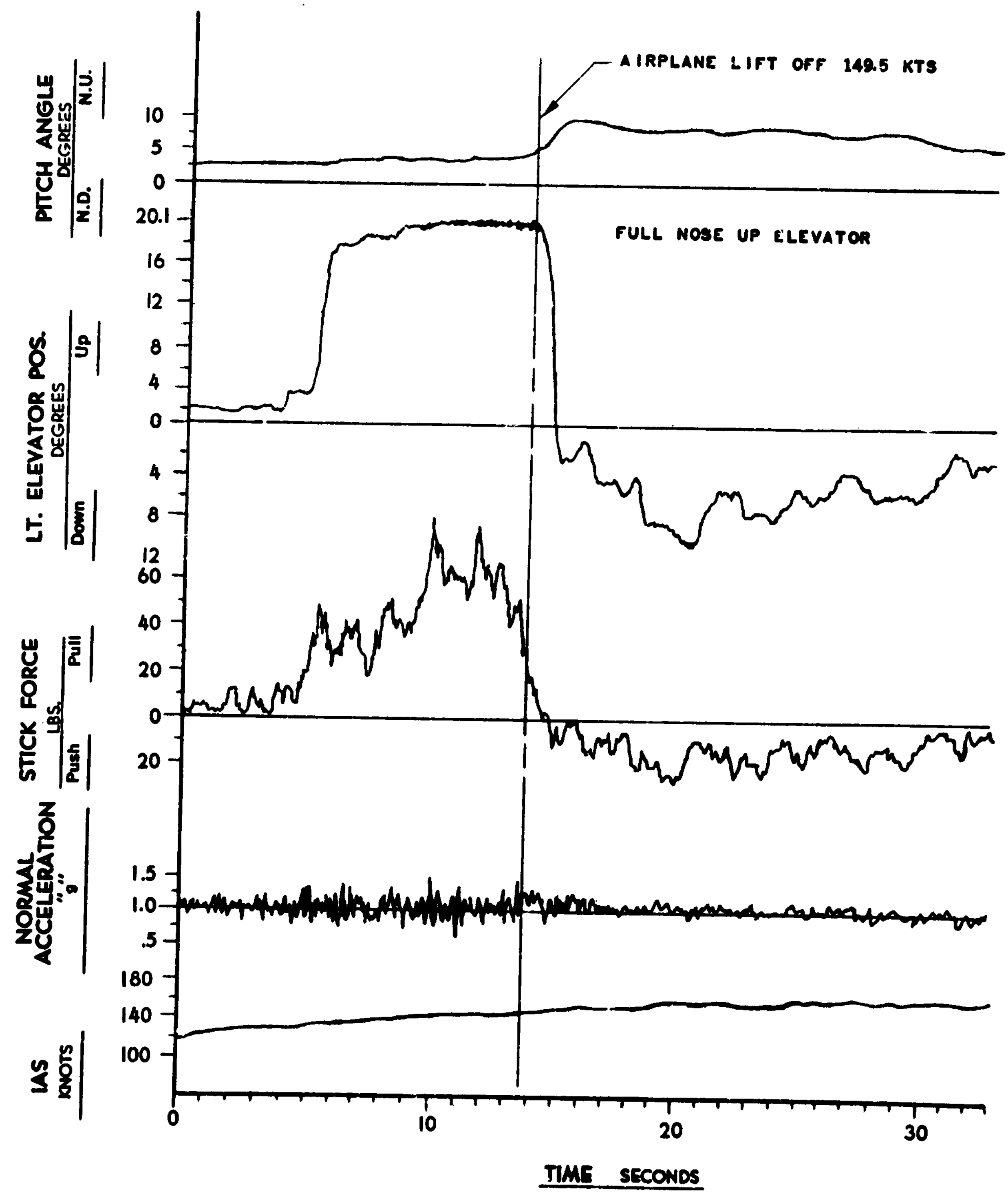


FIGURE NO. 220

TAKEOFF TIME HISTORY

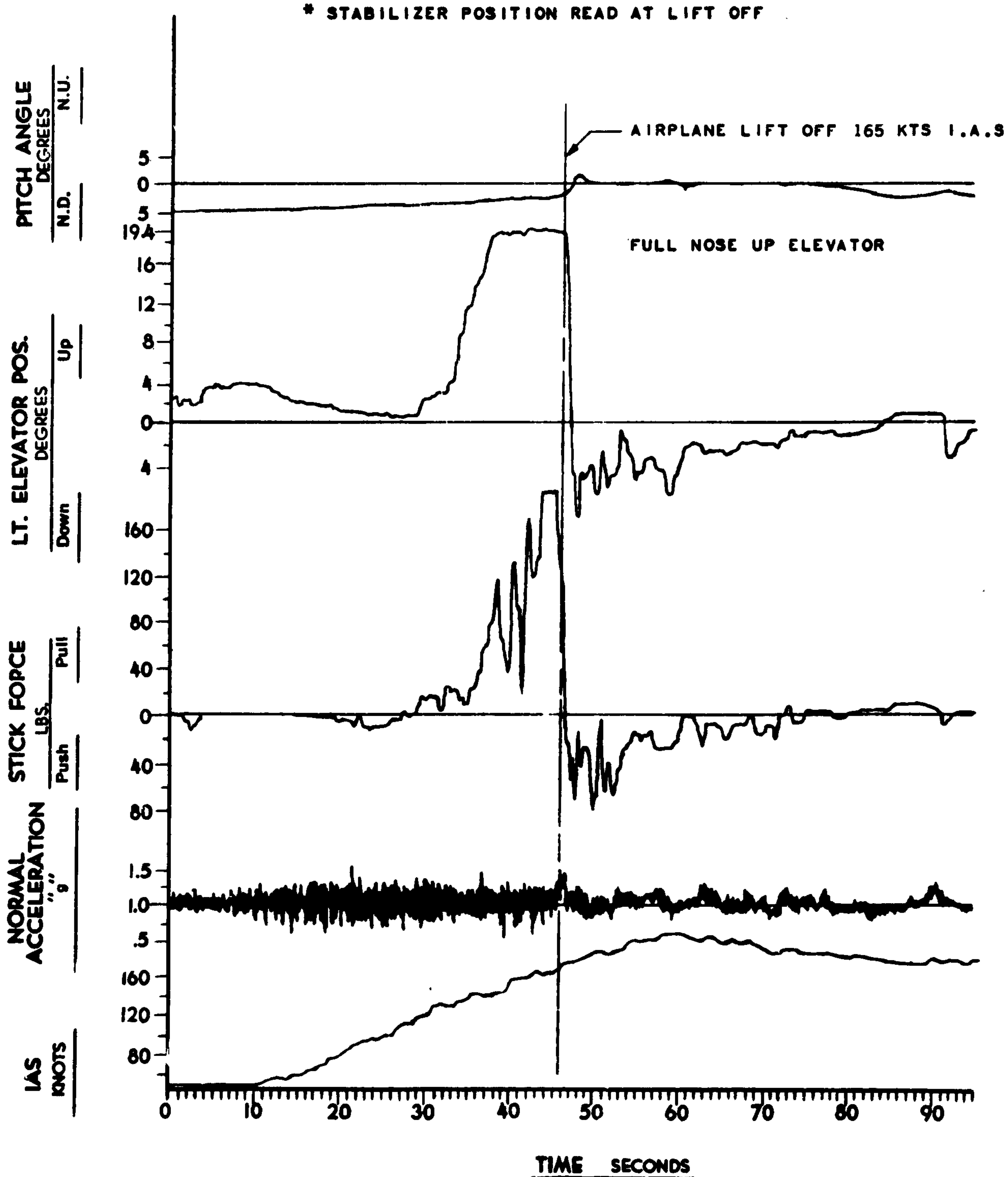
B-52A USAF NO. 52-003
TAKEOFF CONFIGURATION

TRIM CONDITIONS

ALTITUDE SEA LEVEL ; FLAPS UP;
C.G. 27.1 % MAC; WEIGHT 311,500 LBS.
AVG. N_2 9360 RPM; STABILIZER POSITION 4.0 DEG. N.U. *

NO EXTERNAL TANKS INSTALLED

* STABILIZER POSITION READ AT LIFT OFF



LANDINGS

FIGURE NO. 221

LANDING TIME HISTORY

B-52A, USAF NO. 52-003
LANDING CONFIGURATION

TRIM CONDITIONS

ALTITUDE SEA LEVEL FLAPS DOWN
C.G. 21.7 % MAC; WEIGHT 214 500 LBS.
AVG. N2 IDLE RPM; STABILIZER POSITION 4 DEG. N.U.

NO EXTERNAL TANKS INSTALLED

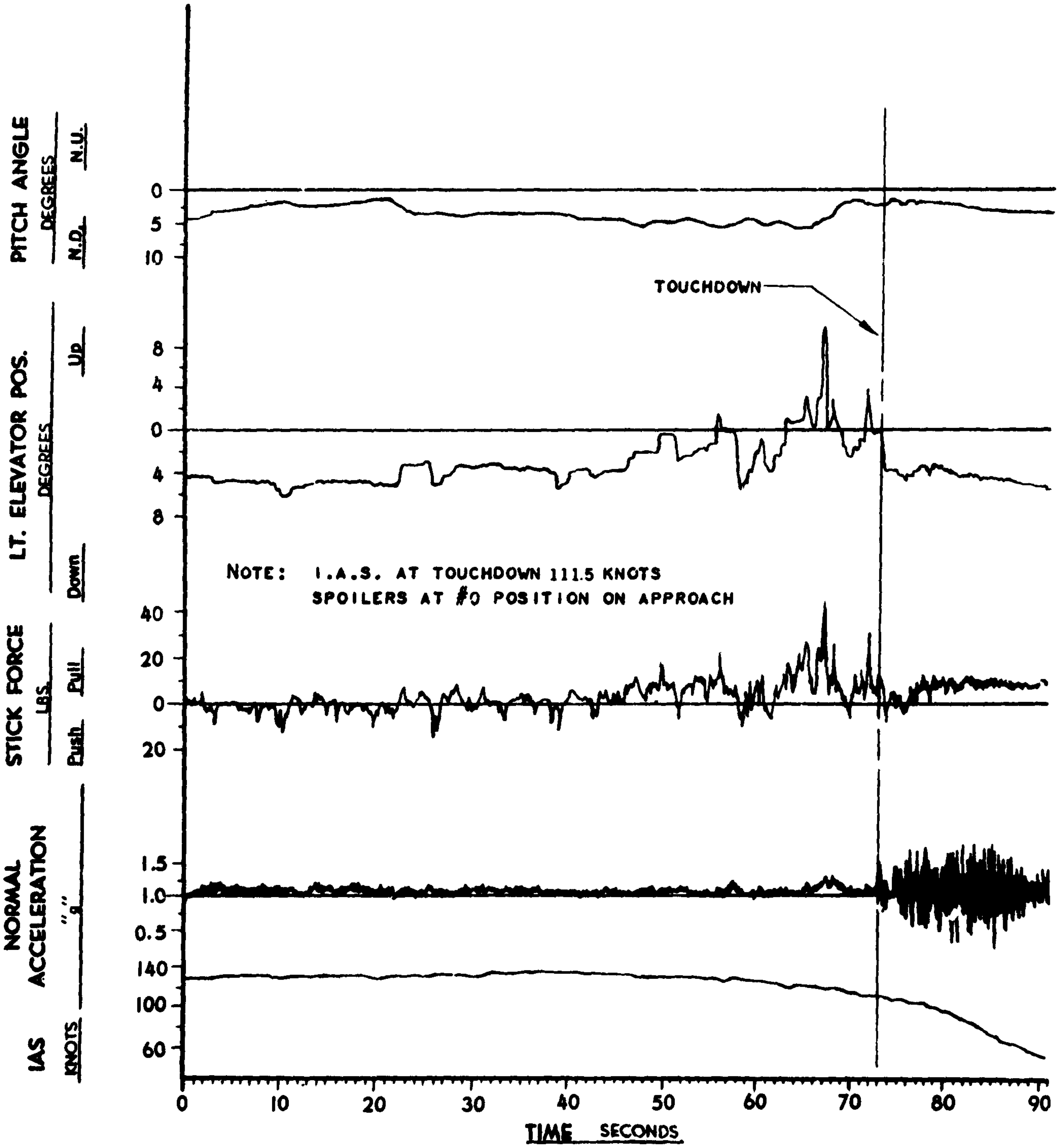


FIGURE NO. 222

LANDING TIME HISTORY

B-52A, USAF NO. 52-003
LANDING CONFIGURATION

TRIM CONDITIONS

ALTITUDE SEA LEVEL; FLAPS DOWN
C.G. 26.1 % MAC; WEIGHT 212600 LBS.
AVG. N_2 IDLE RPM; STABILIZER POSITION 0.9 DEG. N.D.

NO EXTERNAL TANKS INSTALLED

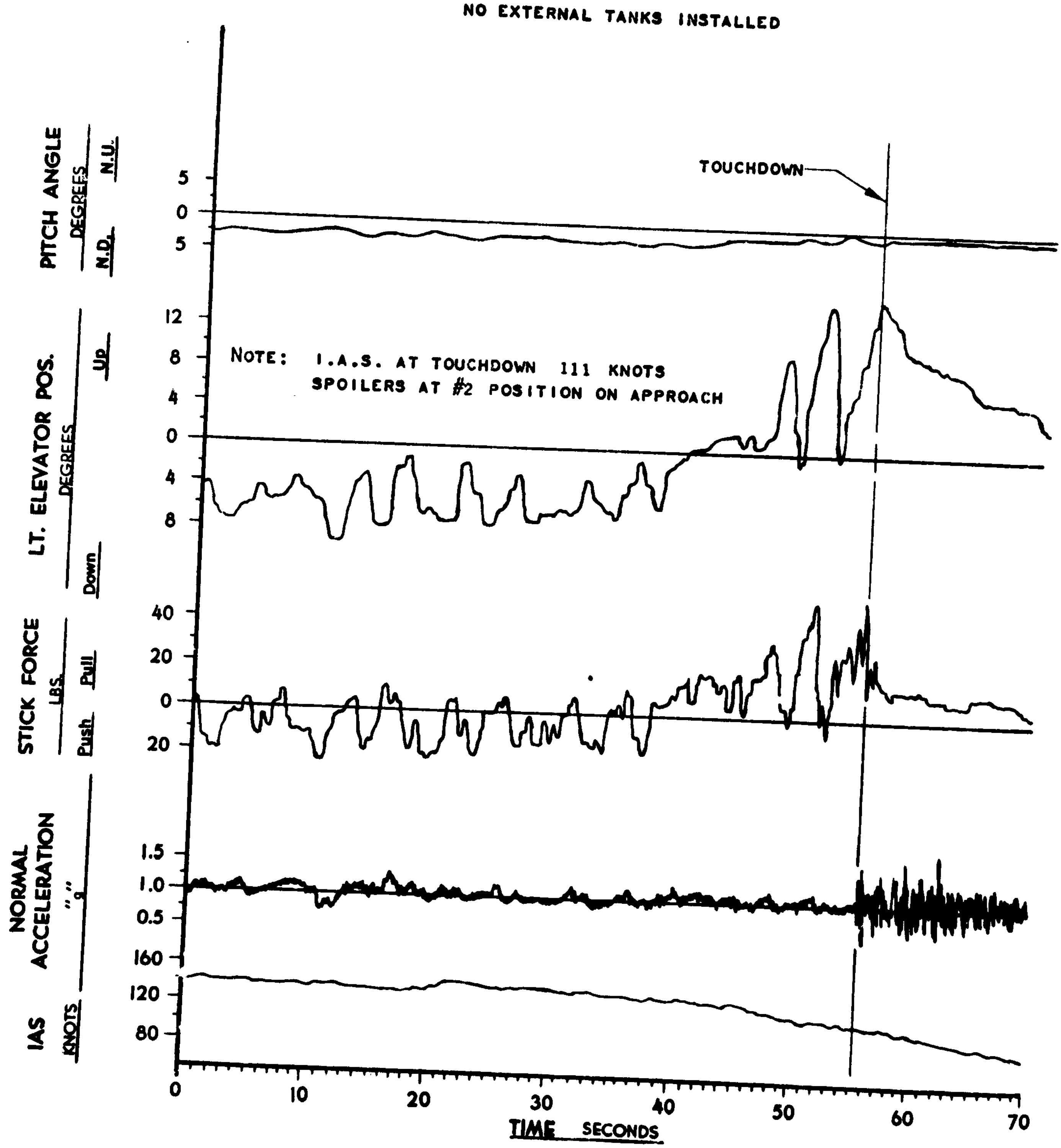


FIGURE NO. 223

LANDING TIME HISTORY

B-52A, USAF NO. 52-003
LANDING CONFIGURATION

TRIM CONDITIONS

ALTITUDE	SEA LEVEL	FLAPS	DOWN
C.G.	26.6 % MAC;	WEIGHT	203,300 LBS.
AVG. N2	IDLE RPM;	STABILIZER POSITION	0.2 DEG. N.D.

NO EXTERNAL TANKS INSTALLED

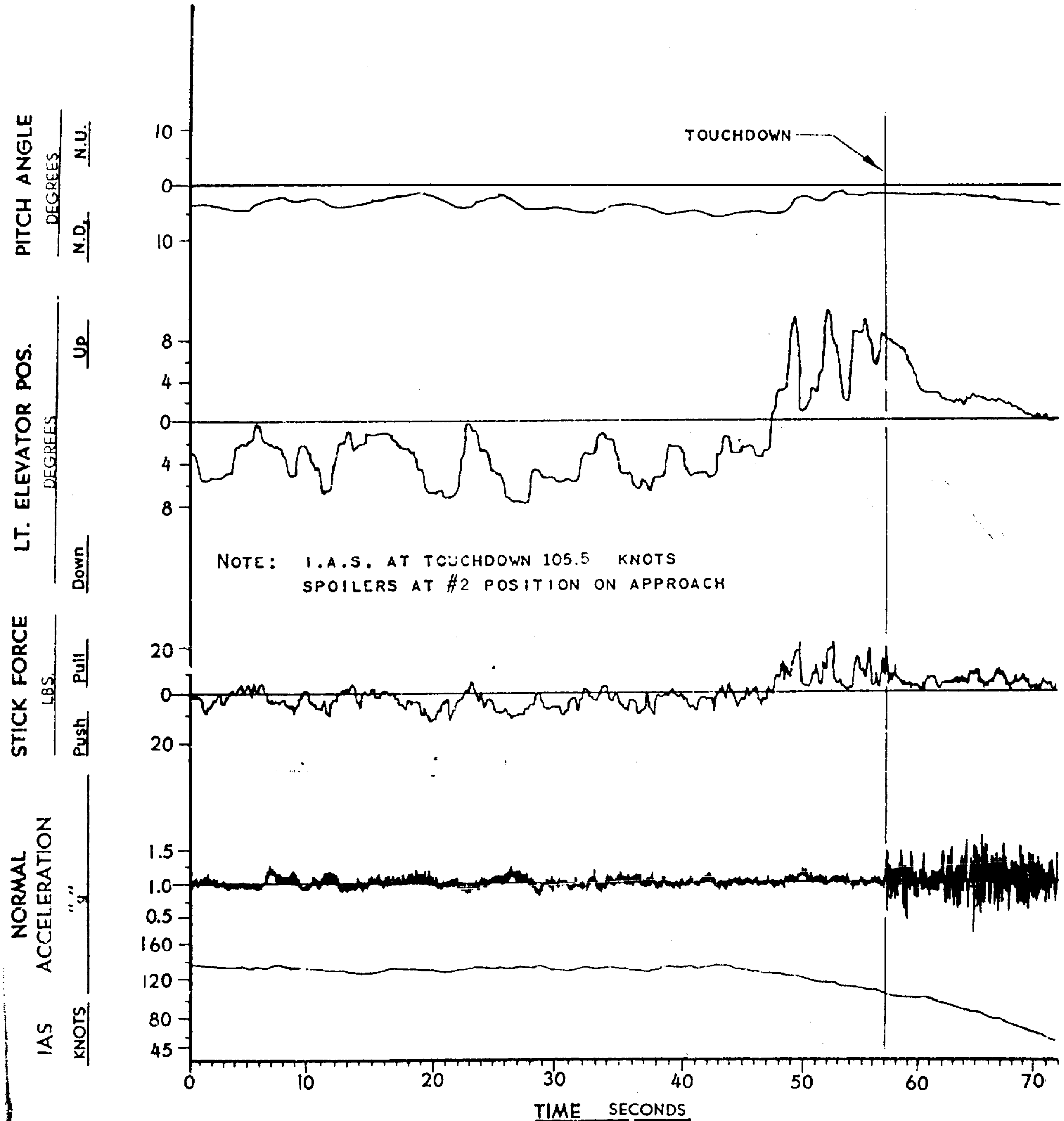


FIGURE NO. 224

LANDING TIME HISTORY

B-52A, USAF NO. 52-003
LANDING CONFIGURATION

TRIM CONDITIONS

ALTITUDE SEA LEVEL FLAPS DOWN
C.G. 28.4 % MAC; WEIGHT 224,500 LBS.
AVG. N2 IDLE RPM; STABILIZER POSITION 0.5 DEG. N.D.

NO EXTERNAL TANKS INSTALLED

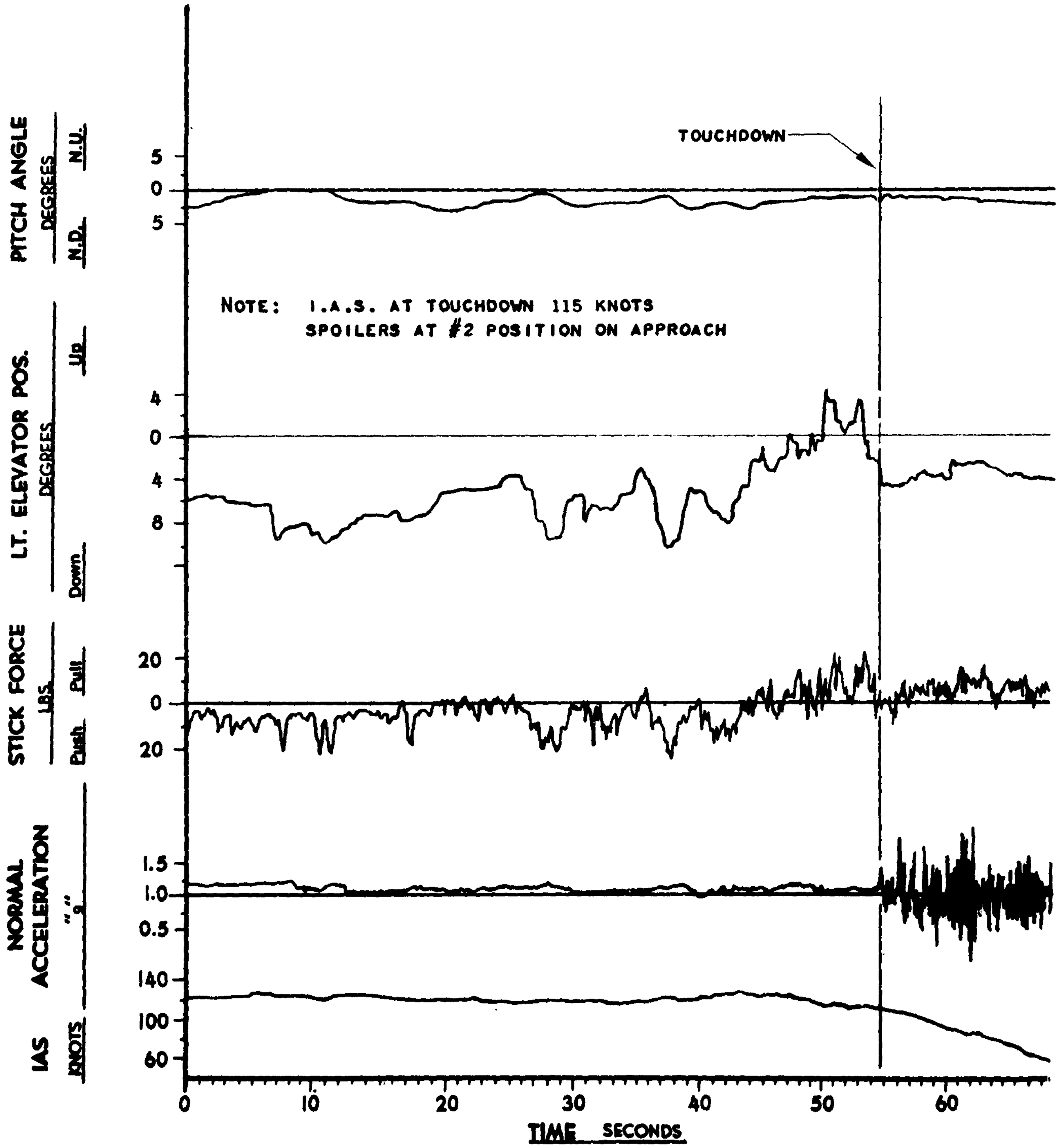


FIGURE NO. 225

LANDING TIME HISTORY

B-52A, USAF NO. 52-003
LANDING CONFIGURATION

TRIM CONDITIONS

ALTITUDE	SEA LEVEL		FLAPS	DOWN	
C.G.	29.4	% MAC;	WEIGHT	327,500	LBS.
AVG. N2	IDLE	RPM;	STABILIZER POSITION	0.2 DEG. N.D.	

EXTERNAL TANKS INSTALLED

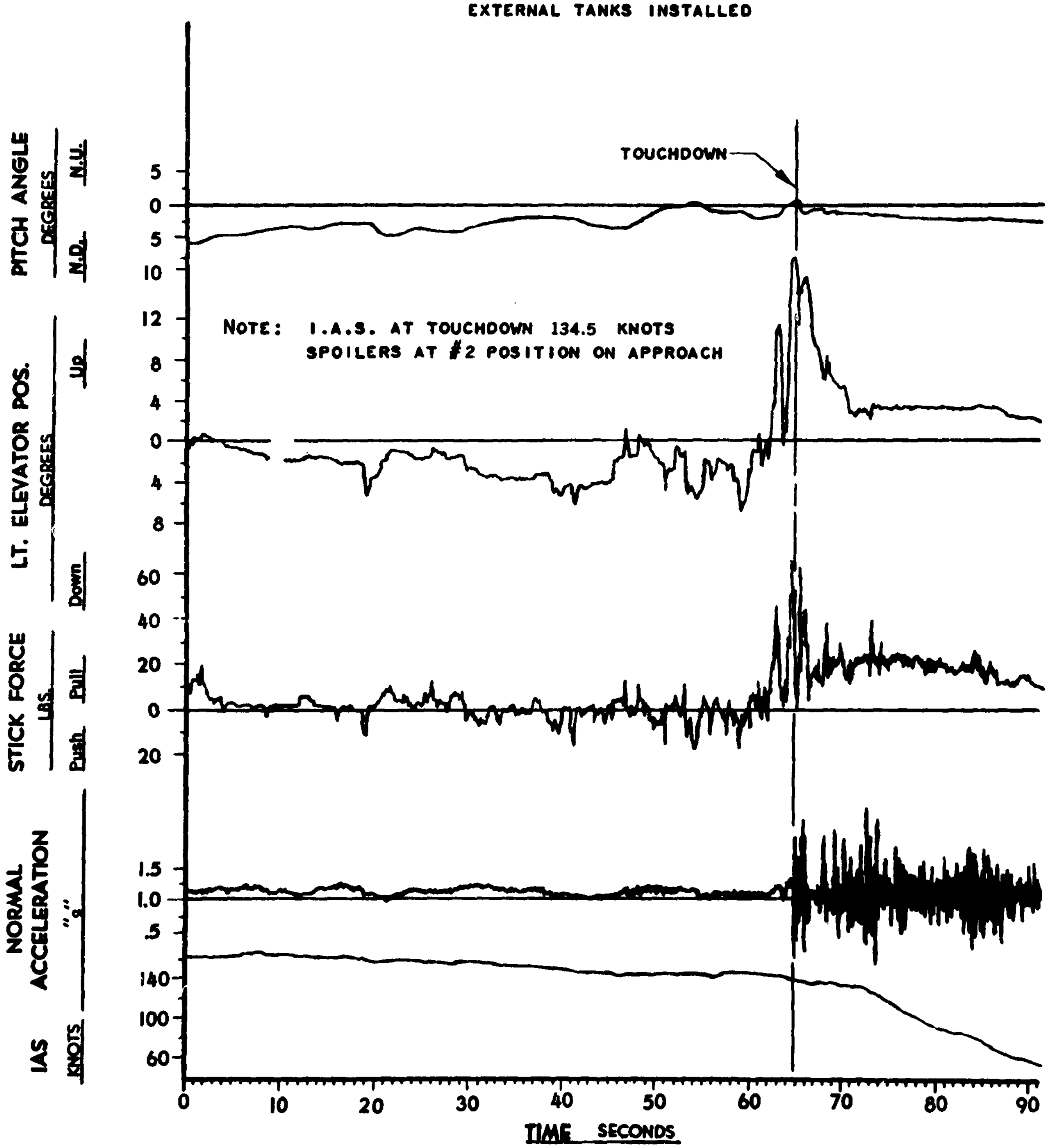


FIGURE NO. 226

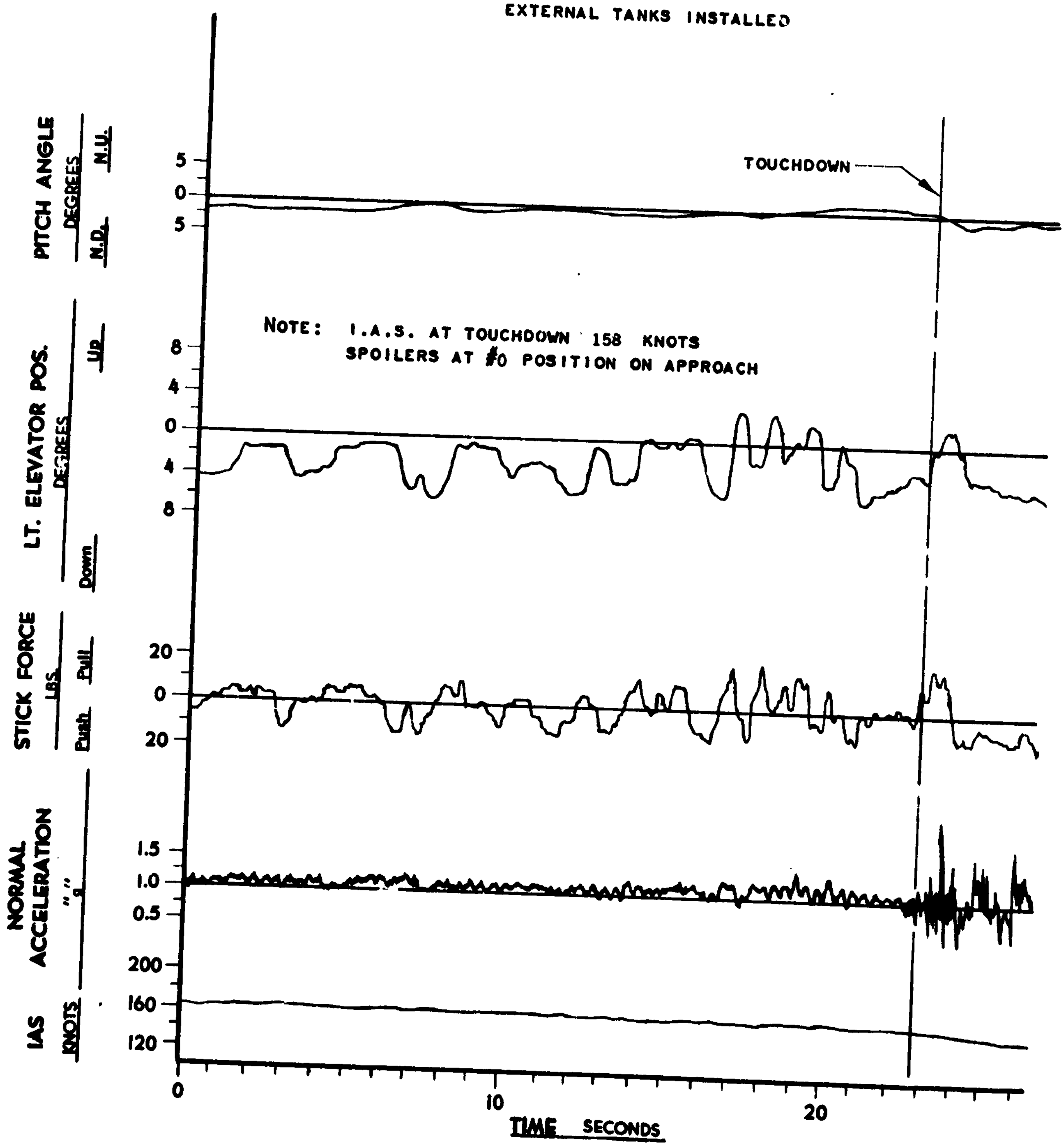
LANDING TIME HISTORY

B-52A, USAF NO. 52-003
LANDING CONFIGURATION

TRIM CONDITIONS

ALTITUDE SEA LEVEL ; FLAPS UP
C.G. 23.3 % MAC; WEIGHT 221,000 LBS.
AVG. N2 6610 RPM; STABILIZER POSITION 3.3 DEG. N.U.

EXTERNAL TANKS INSTALLED



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PRESENTING PLOTS

STALLS

FIGURE NO. 227

STALL TIME HISTORY
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S. 125 KNOTS ; ALTITUDE 12 700 FEET
C.G. 19.5 % MAC; WEIGHT 234 500 LBS.
AVG. N2 8910 RPM; STABILIZER POSITION 3.9 DEG. N.U.
L. AIL. TAB 2.4 DEG. T. E. UP R. AIL. TAB. 5.4 DEG T. E. UP
RUDDER TAB 2.4 DEG. T. E. RT.

NO EXTERNAL TANKS INSTALLED

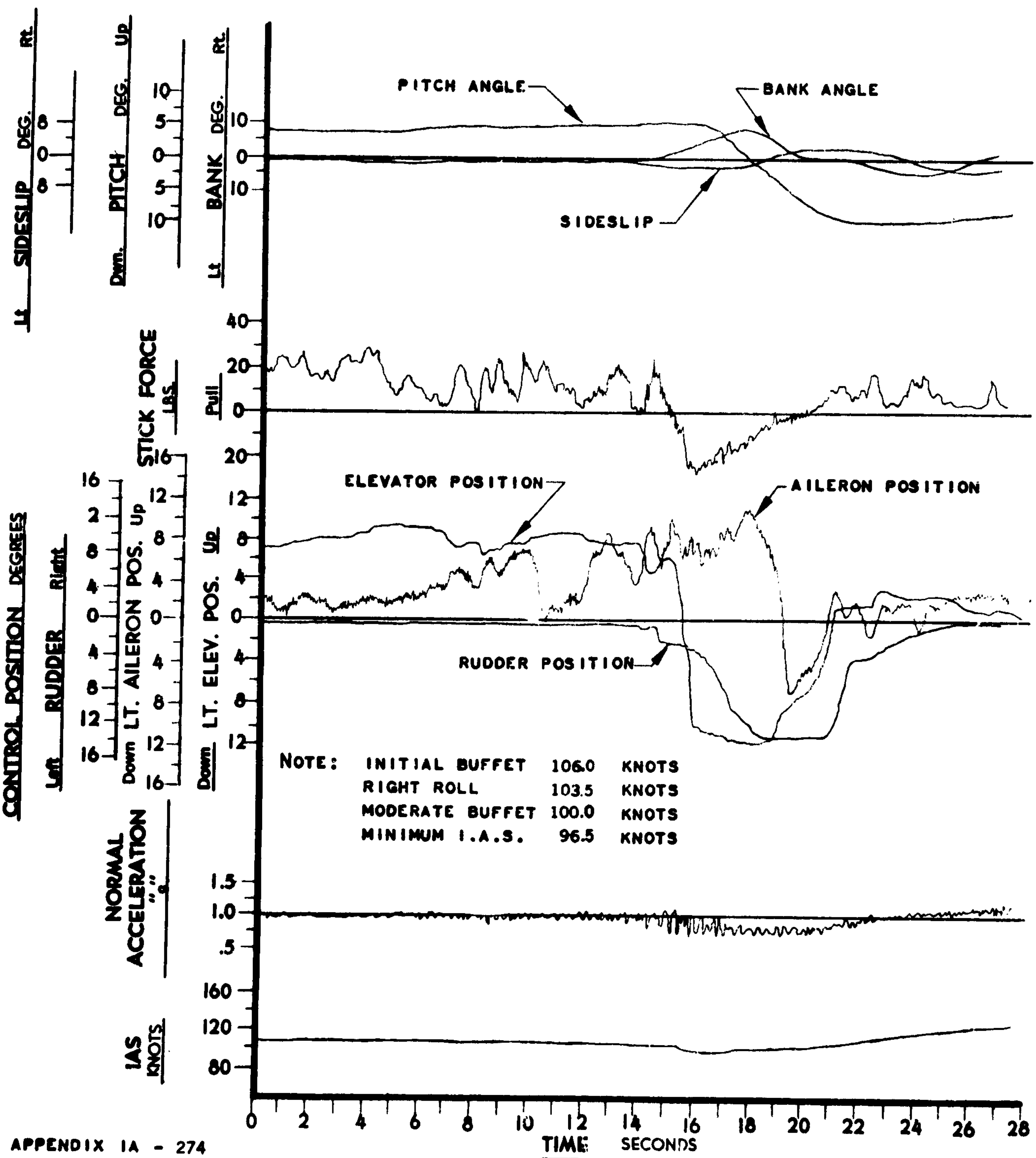


FIGURE NO. 228

STALL TIME HISTORY
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S. 129 KNOTS : ALTITUDE 13,800 FEET
C.G. 19.4 % MAC; WEIGHT 238,300 LBS.
AVG. N2 9150 RPM; STABILIZER POSITION 3.0 DEG. N.U.
L. AIL. TAB 3.0 DEG. T. E. UP R. AIL. TAB. 4.8 DEG. T. E. UP
RUDDER TAB 1.2 DEG. T. E. RT.

NO EXTERNAL TANKS INSTALLED

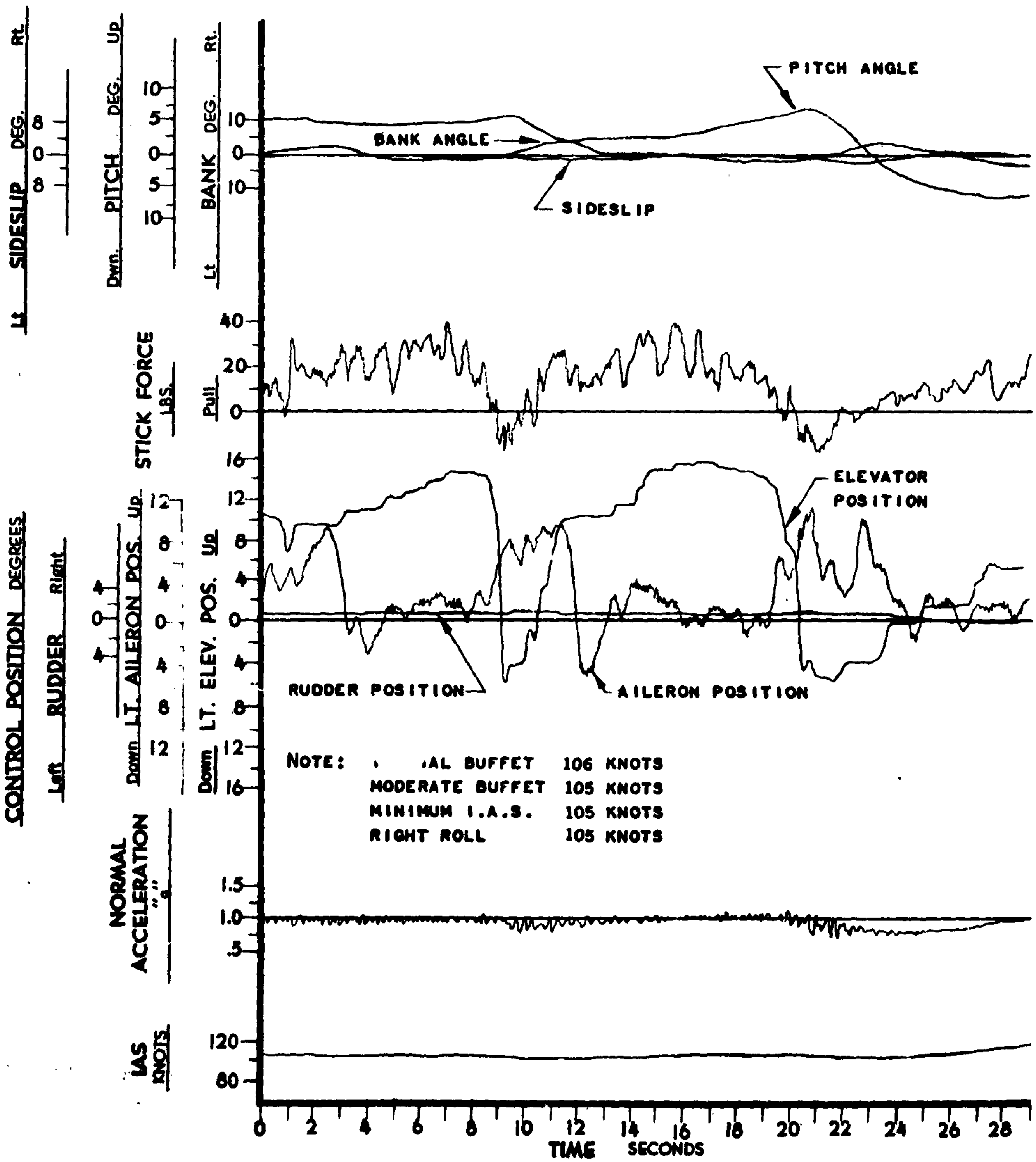


FIGURE NO. 229

STALL TIME HISTORY
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S. 126.5 KNOTS ; ALTITUDE 13,900 FEET
C.G. 31.2 % MAC; WEIGHT 220,000 LBS.
AVG. N2 8540 RPM; STABILIZER POSITION 3.5 DEG. N.D.
L. AIL. TAB 0.8 DEG. T. E. DN. R. AIL. TAB. 0.6 DEG. T. E. UP
RUDDER TAB 2.1 DEG. T. E. LT.

NO EXTERNAL TANKS INSTALLED

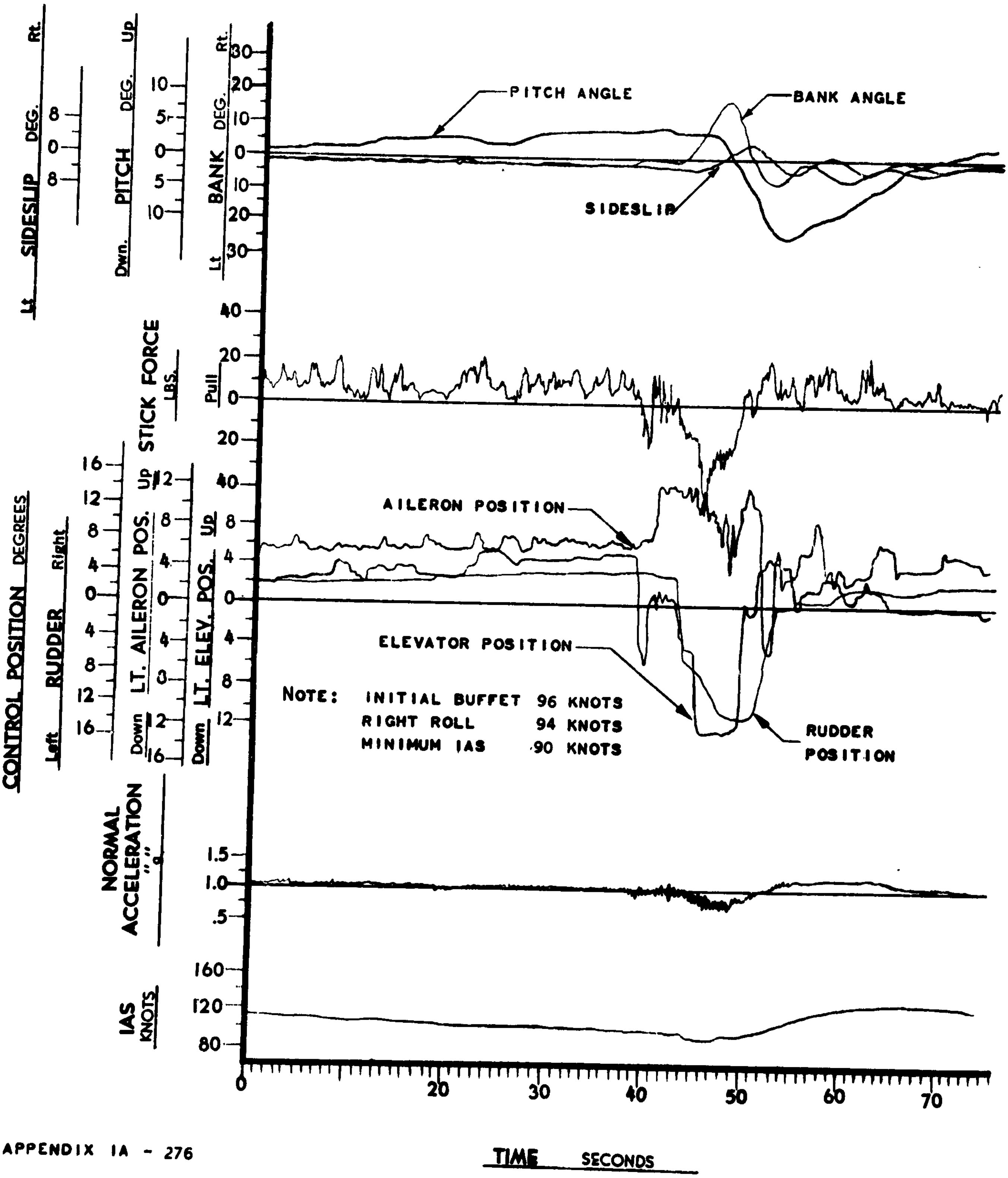


FIGURE NO. 230

STALL TIME HISTORY
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S. 126.5 KNOTS ; ALTITUDE 13,900 FEET
C.G. 31.2 % MAC; WEIGHT 220,000 LBS.
AVG. N_2 8540 RPM; STABILIZER POSITION 3.5 DEG. N.D.
L. AIL. TAB 0.8 DEG. T. E. DN. R. AIL. TAB. 0.6 DEG. T. E. UP
RUDDER TAB 2.1 DEG. T. E. LT.

NO EXTERNAL TANKS INSTALLED

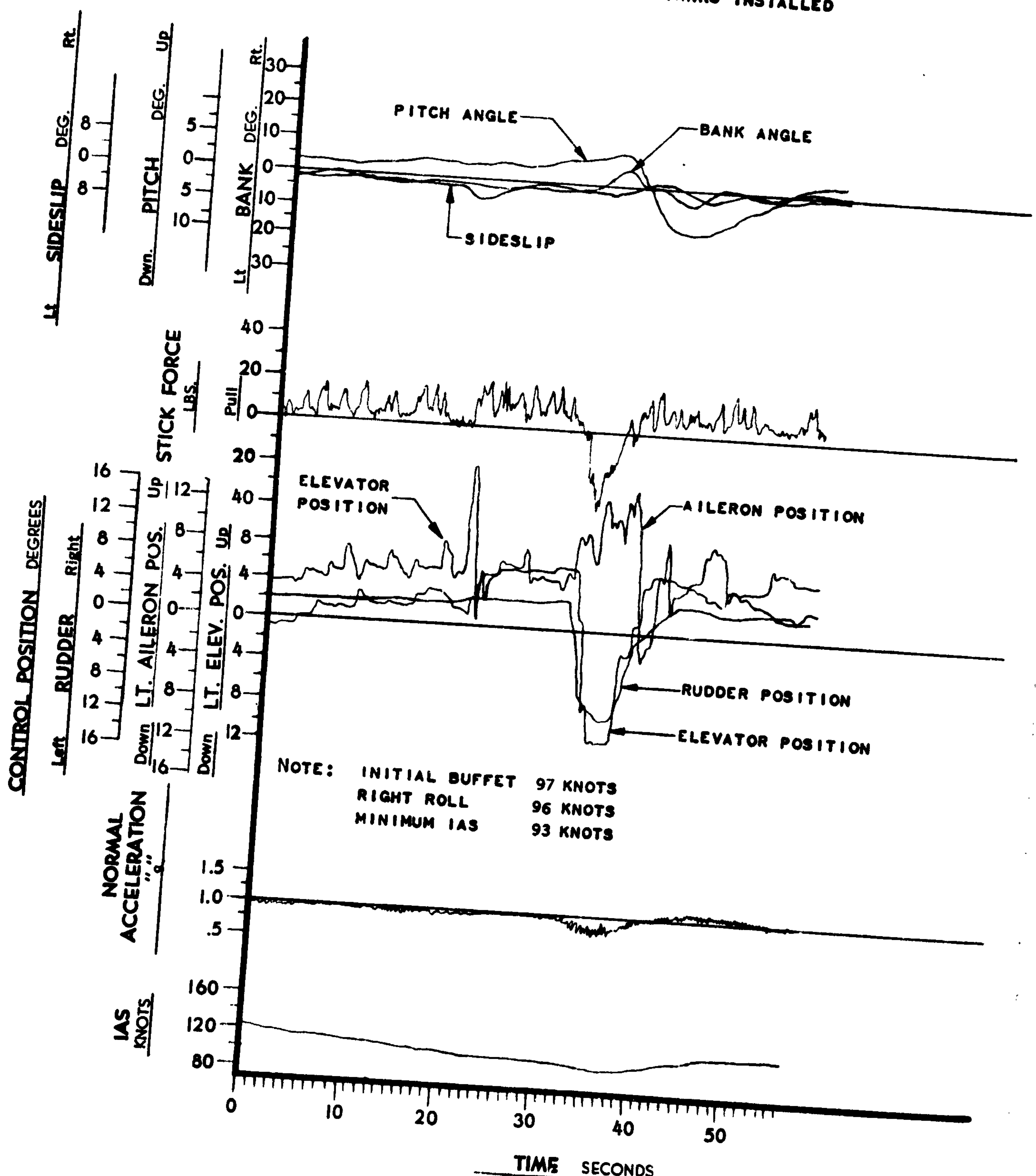


FIGURE NO. 231

STALL TIME HISTORY

B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S. 126.5 KNOTS; ALTITUDE 13,900 FEET
C.G. 31.2 % MAC; WEIGHT 220,000 LBS.
AVG. N2 8540 RPM; STABILIZER POSITION 3.5 DEG. N.D.
L. AIL. TAB 0.8 DEG. T. E. DN. R. AIL. TAB. 0.6 DEG. T. E. UP
RUDDER TAB 2.1 DEG. T. E. LT.

NO EXTERNAL TANKS INSTALLED

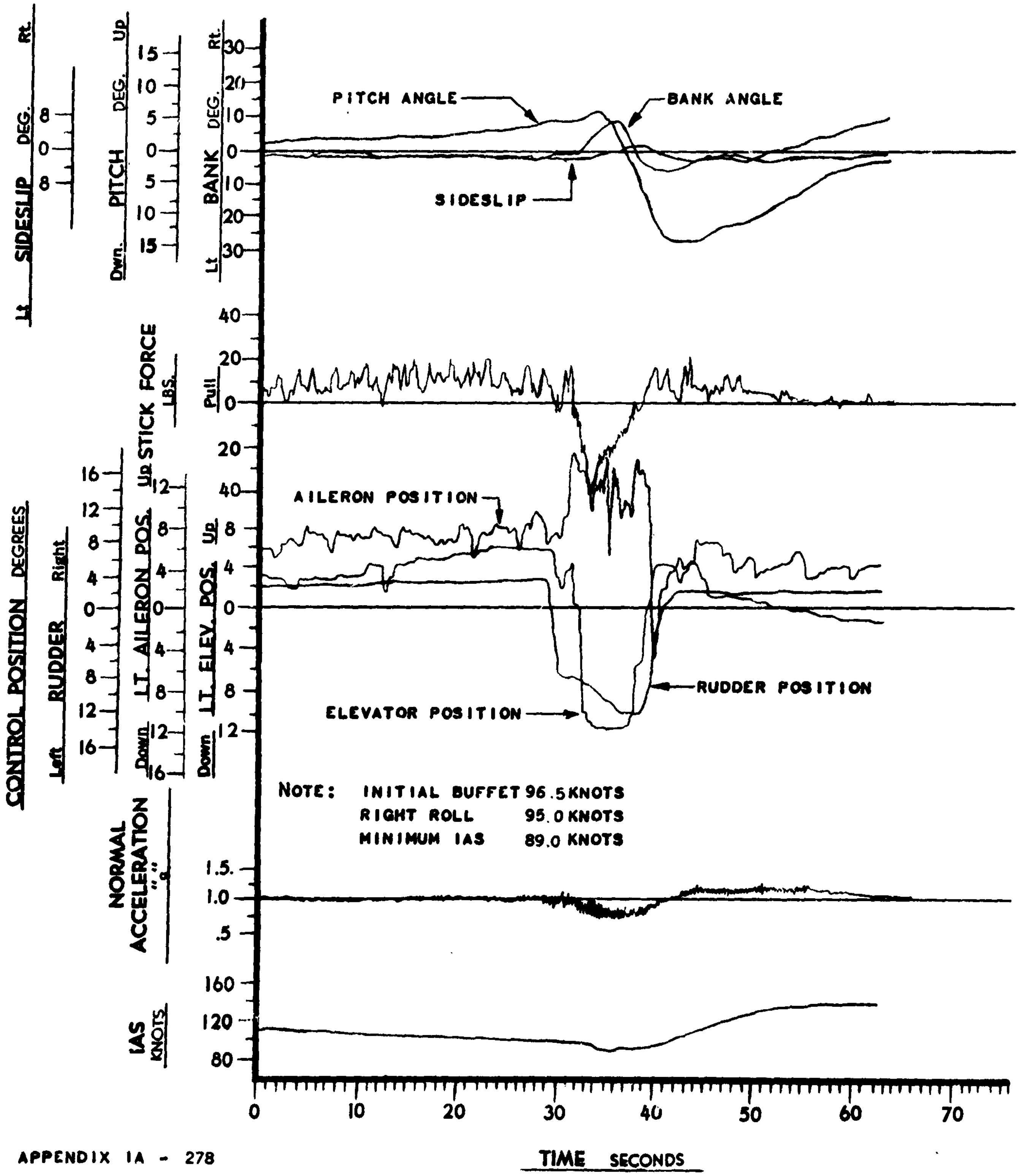


FIGURE NO. 232

STALL TIME HISTORY
B-52A, USAF NO. 52-003
LANDING CONFIGURATION

TRIM CONDITIONS

C.A.S. 130 KNOTS; ALTITUDE 14,900 FEET
C.G. 19.4 % MAC; WEIGHT 236,800 LBS.
AVG. N_2 IDLE RPM; STABILIZER POSITION 4.2 DEG. N.U.
L. AIL. TAB 3.0 DEG. T. E. UP R. AIL. TAB. 4.8 DEG. T. E. UP
RUDDER TAB 2.4 DEG. T. E. RT

NO EXTERNAL TANKS INSTALLED

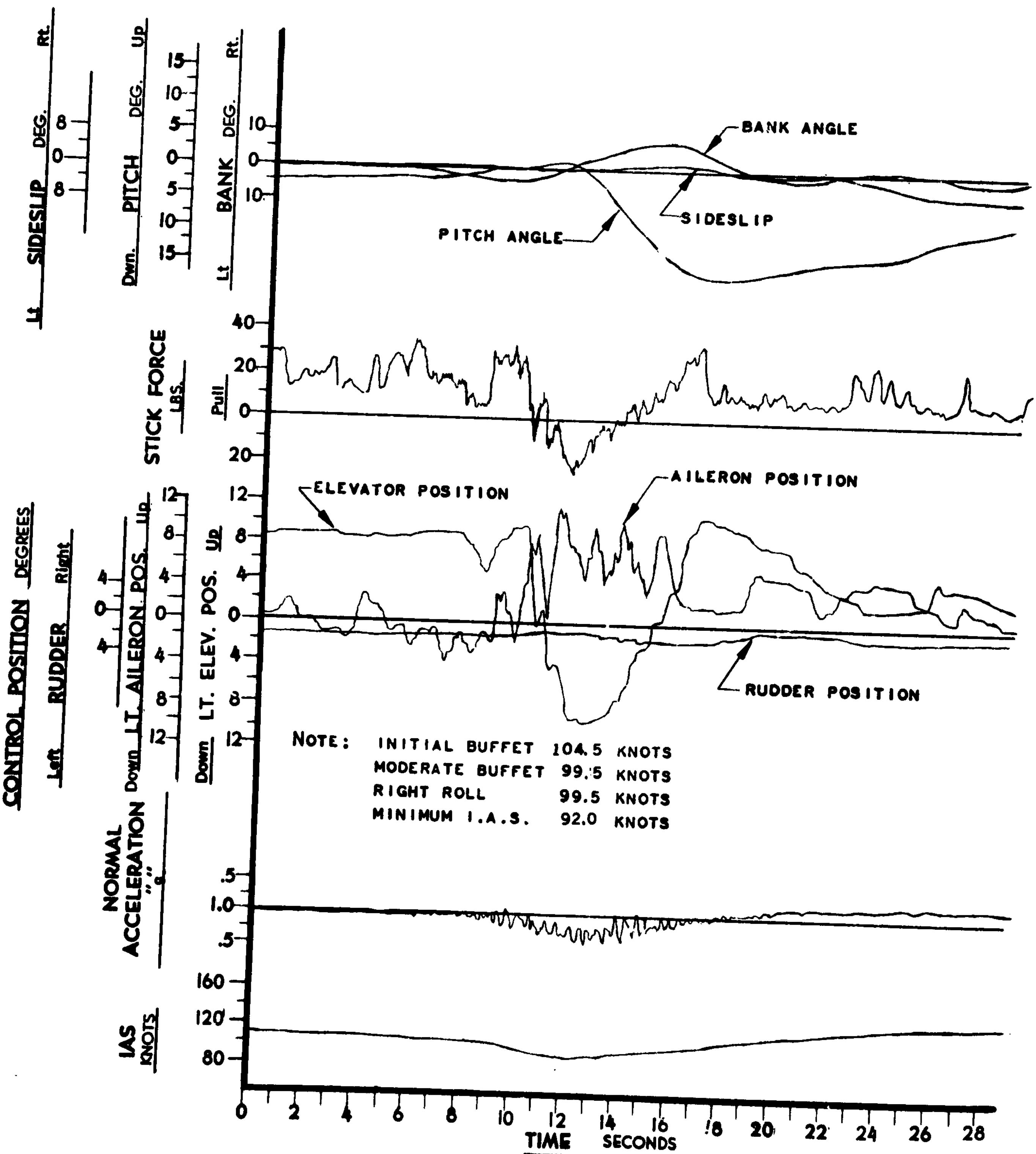


FIGURE NO. 233

STALL TIME HISTORY

B-52A, USAF NO. 52-003
LANDING CONFIGURATION

TRIM CONDITIONS

C.A.S. 130 KNOTS: ALTITUDE 14,900 FEET
C.G. 19.4 % MAC; WEIGHT 236,800 LBS.
AVG. N2 IDLE RPM; STABILIZER POSITION 4.2 DEG N.U.
L. AIL. TAB 3.0 DEG. T. E. UP R. AIL. TAB. 4.8 DEG. T. E. UP
RUDDER TAB 2.4 DEG. T. E. RT.

NO EXTERNAL TANKS INSTALLED

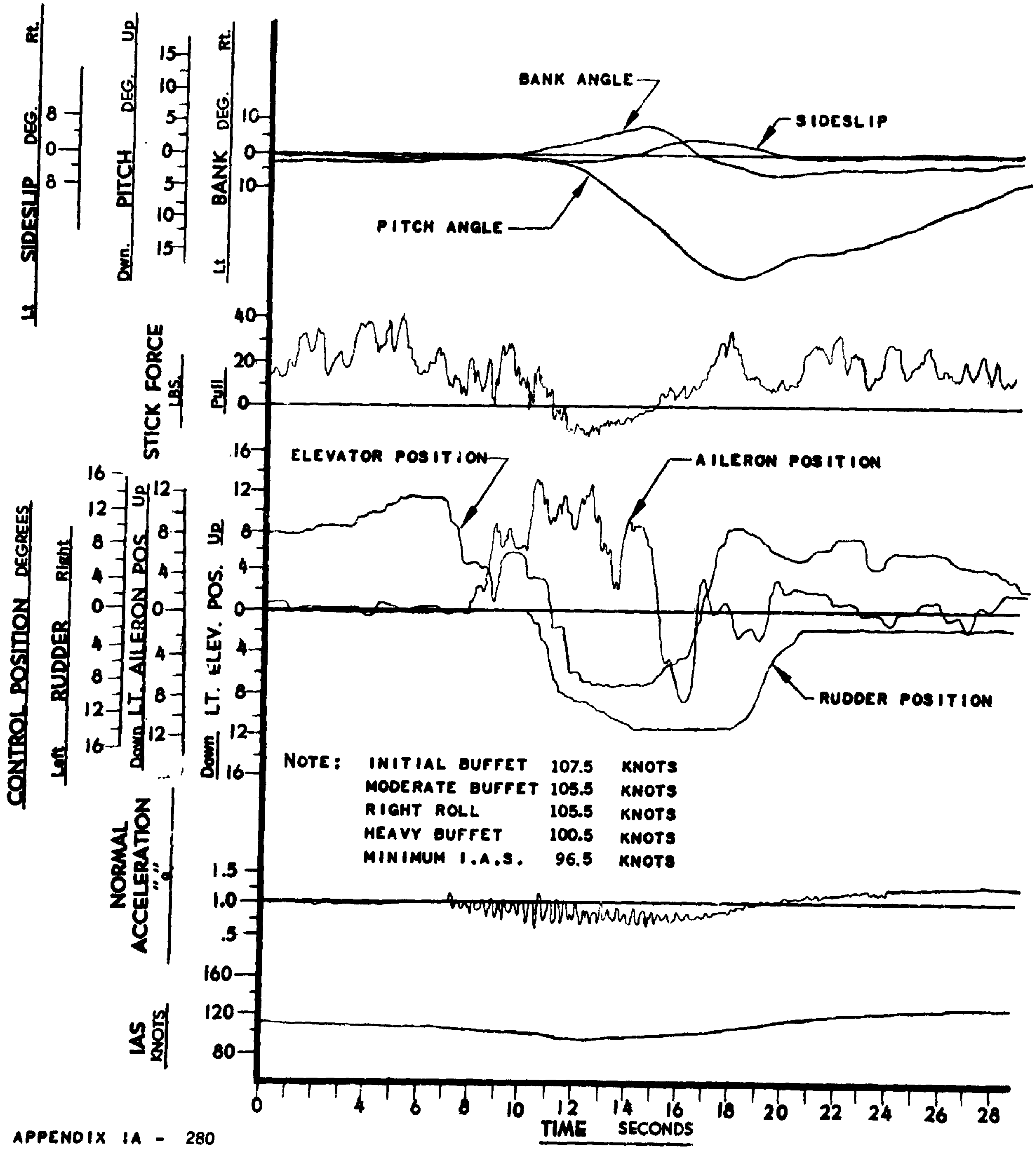


FIGURE NO. 234

STALL TIME HISTORY

B-52A, USAF NO. 52-003
LANDING CONFIGURATION

TRIM CONDITIONS

C.A.S. 128 KNOTS: ALTITUDE 13,300 FEET
C.G. 30.6 % MAC; WEIGHT 218,000 LBS.
AVG. N_2 IDLE RPM; STABILIZER POSITION 2.6 DEG. N.D.
L. AIL. TAB 0.4 DEG. T. E. U. R. AIL. TAB. 0.6 DEG. T. E. DN.
RUDDER TAB 3.0 DEG. T. E. LT.

NO EXTERNAL TANKS INSTALLED

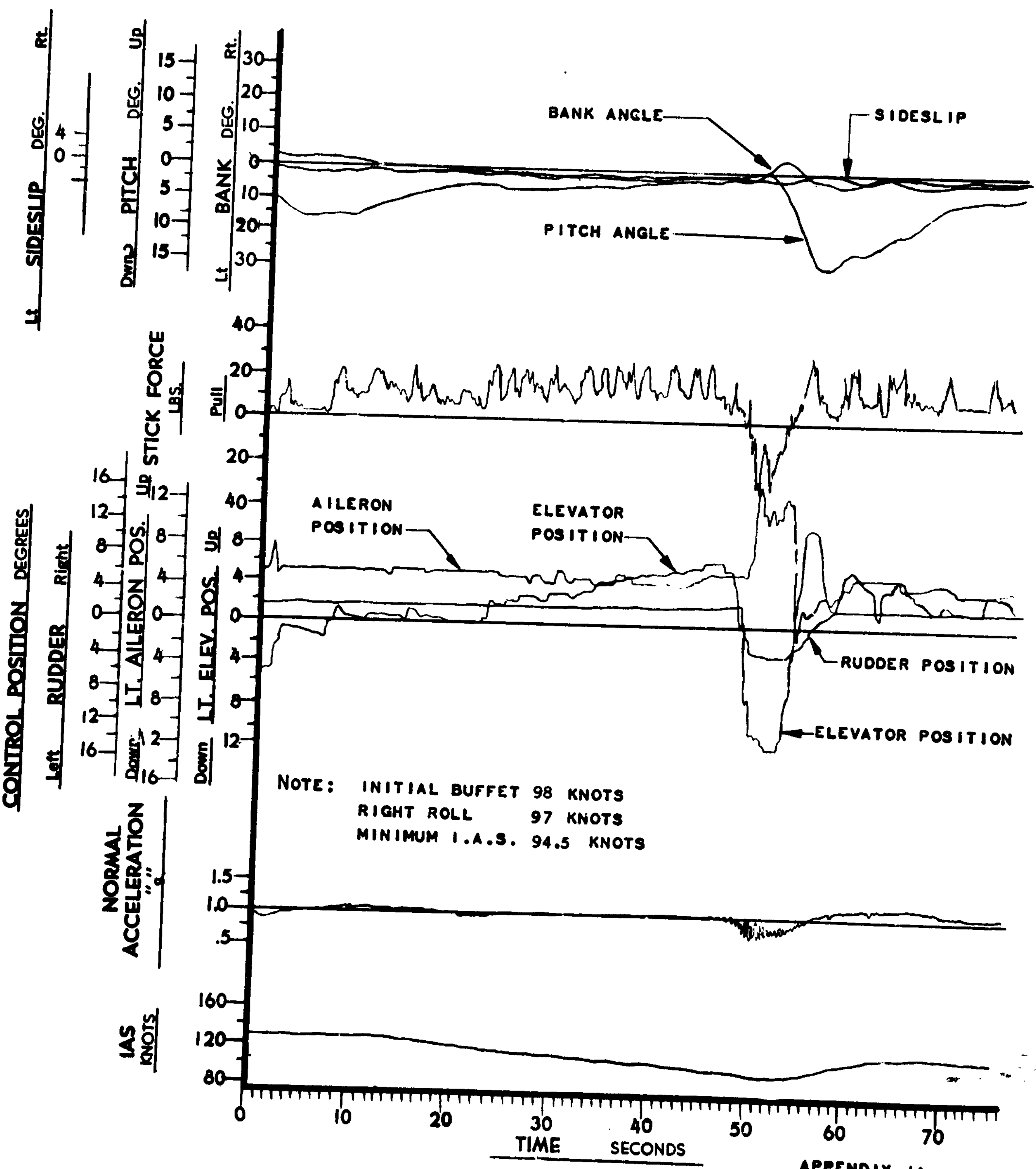


FIGURE NO. 235

STALL TIME HISTORY

B-52A, USAF NO. 52-003
LANDING CONFIGURATION

TRIM CONDITIONS

C.A.S. 128 KNOTS; ALTITUDE 13,300 FEET
C.G. 30.6 % MAC; WEIGHT 218,000 LBS.
AVG. N_2 IDLE RPM; STABILIZER POSITION 2.6 DEG. N.D.
L. AIL. TAB 0.4 DEG. T. E. UP R. AIL. TAB. 0.6 DEG. T. E. DN.
RUDDER TAB 3.0 DEG. T. E. LT.

NO EXTERNAL TANKS INSTALLED

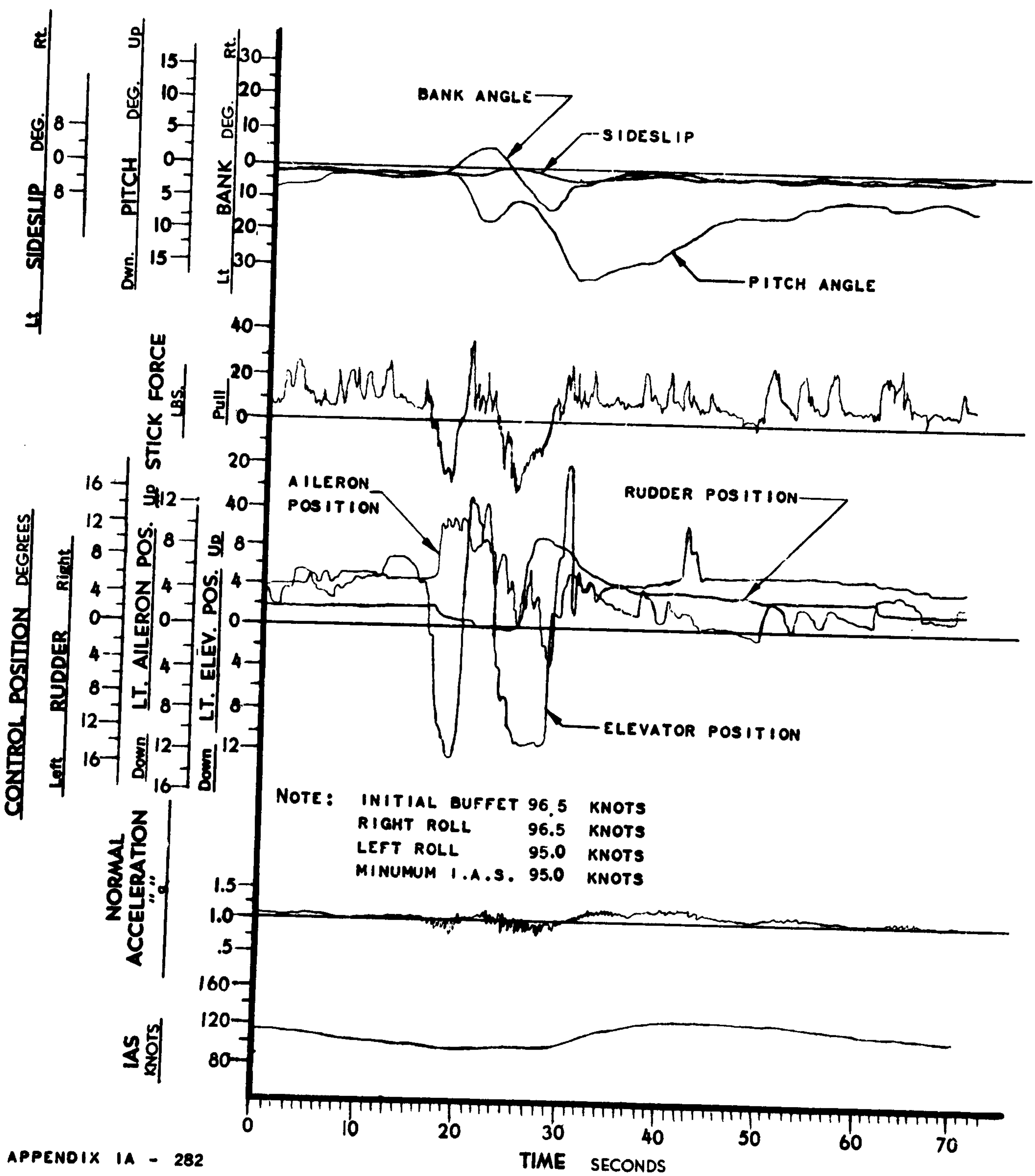


FIGURE NO. 236

STALL TIME HISTORY

B-52A, USAF NO. 52-003
CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 190.5 KNOTS ; ALTITUDE 19,500 FEET
C.G. 19.1 % MAC; WEIGHT 232,000 LBS.
AVG. N2 79.80 RPM; STABILIZER POSITION 2.4 DEG. N.U.
L. AIL. TAB 5.6 DEG. T. E. UP R. AIL. TAB. 1.0 DEG. T. E. UP
RUDDER TAB 0.6 DEG. T. E. LT.

NO EXTERNAL TANKS INSTALLED

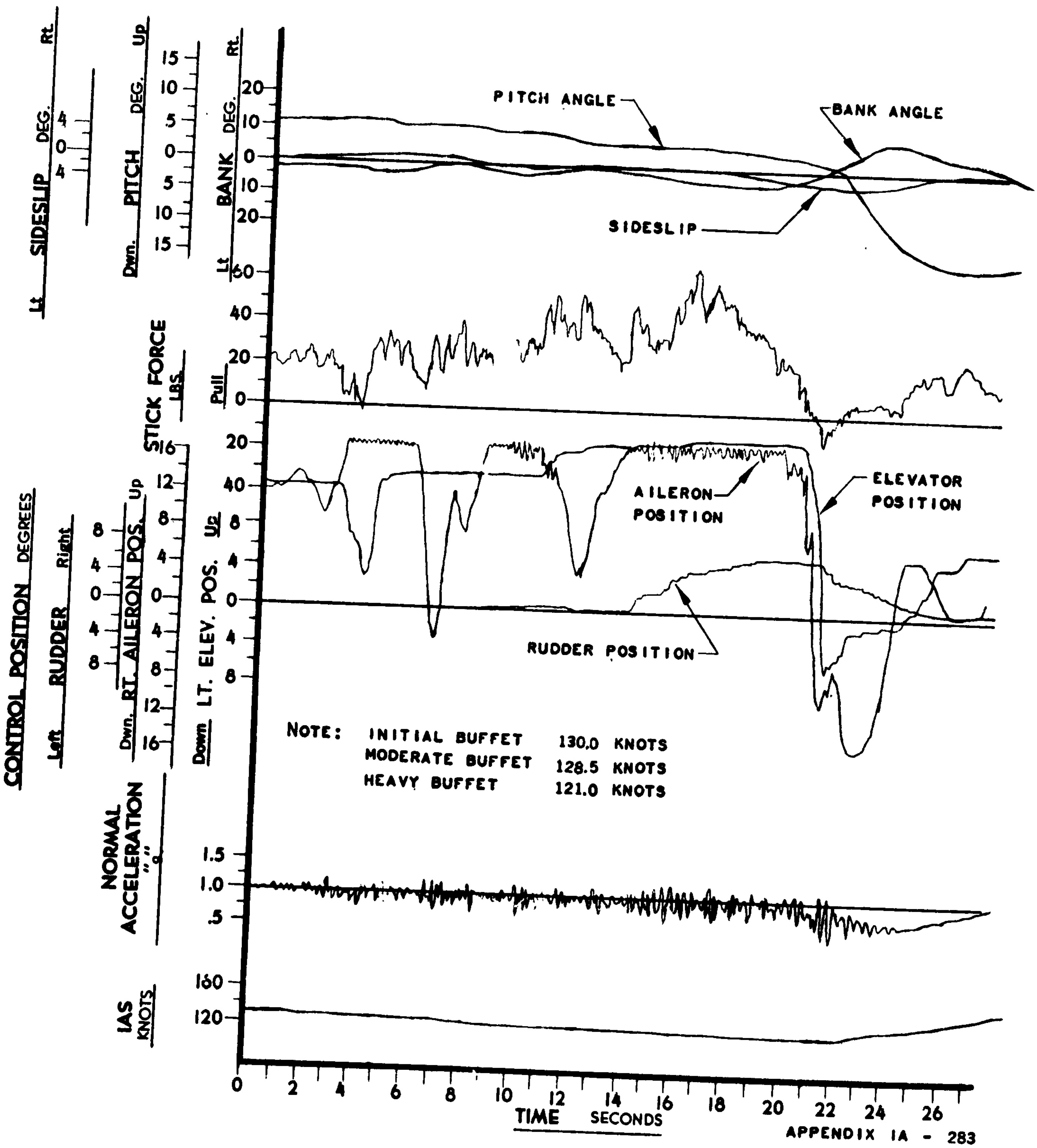


FIGURE NO. 237

STALL TIME HISTORY

B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S. 127 KNOTS : ALTITUDE 20,000 FEET
C.G. 19.6 % MAC; WEIGHT 241,800 LBS.
AVG. N2 8580 RPM; STABILIZER POSITION 3.2 DEG. N.U.
L. AIL. TAB 0.6 DEG. T. E. UP R. AIL. TAB. 3.1 DEG. T. E. UP
RUDDER TAB 3.3 DEG. T. E. LT.

EXTERNAL TANKS INSTALLED

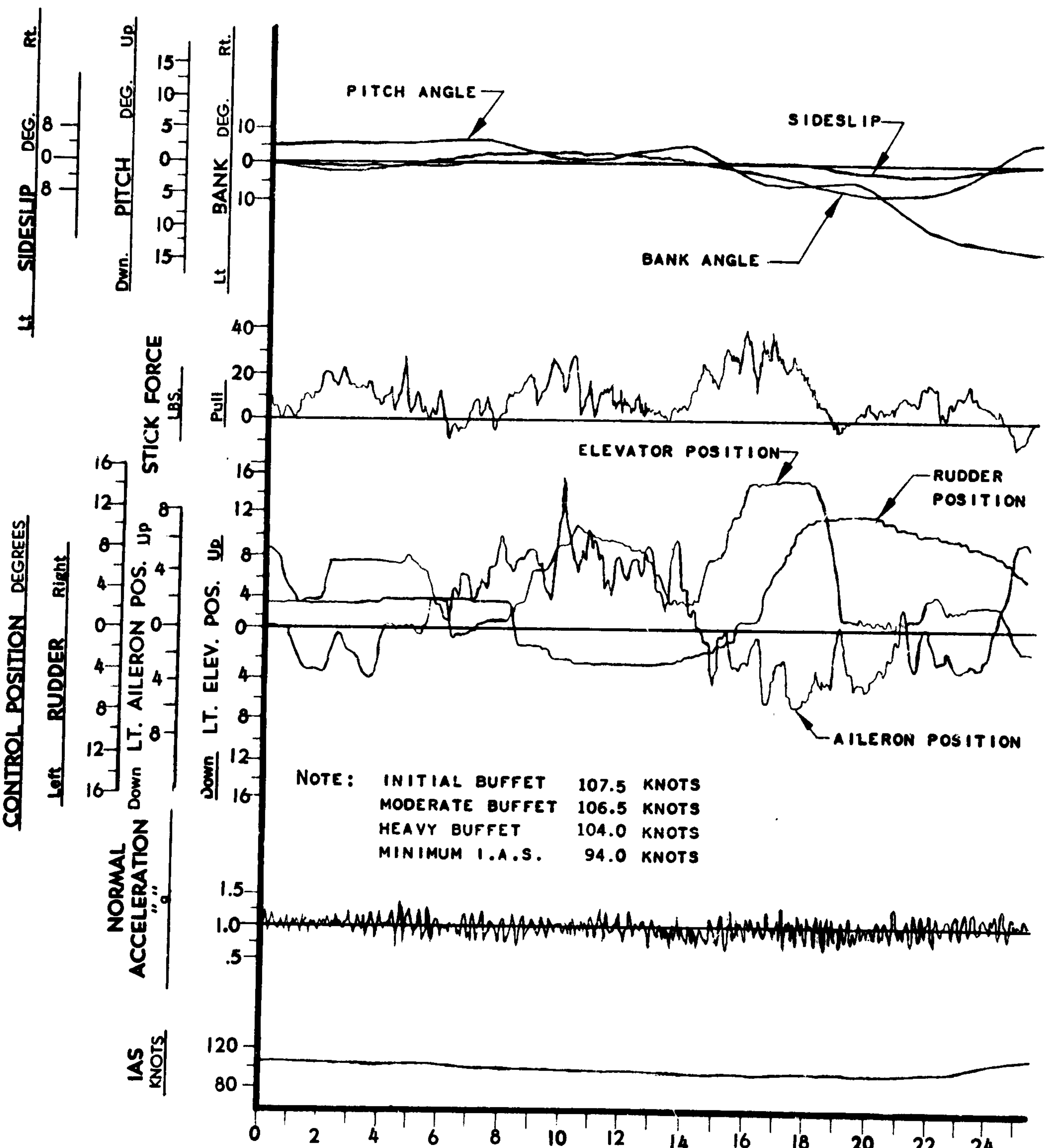


FIGURE NO. 238

STALL TIME HISTORY

B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S. 133 KNOTS : ALTITUDE 18,800 FEET
C.G. 34.5 % MAC; WEIGHT 239,500 LBS.
AVG. N_2 8890 RPM; STABILIZER POSITION 4.8 DEG. N.D.
L. AIL. TAB 2.9 DEG. T. E. UP R. AIL. TAB. 3.5 DEG. T. E. DN.
RUDDER TAB 0 DEG.

EXTERNAL TANKS INSTALLED

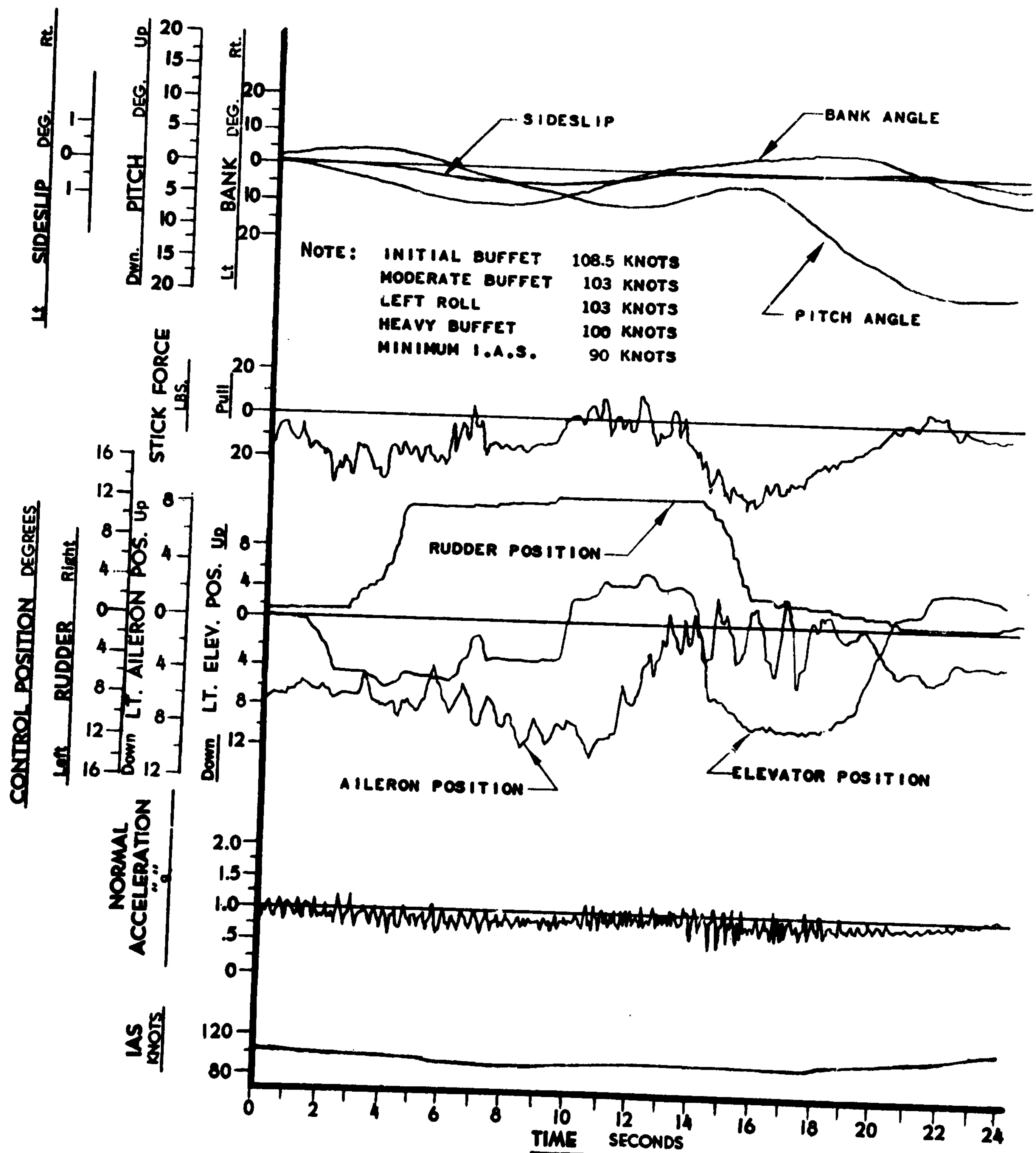


FIGURE NO. 239

STALL TIME HISTORY
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S. 133 KNOTS: ALTITUDE 18,800 FEET
C.G. 34.5 % MAC; WEIGHT 239,500 LBS.
AVG. N? 8890 RPM: STABILIZER POSITION 4.8 DEG. N.D.
L. AIL. TAB 2.9 DEG. T. E. UP R. AIL. TAB. 3.5 DEG. T. E. DN.
RUDDER TAB 0 DEG.

EXTERNAL TANKS INSTALLED

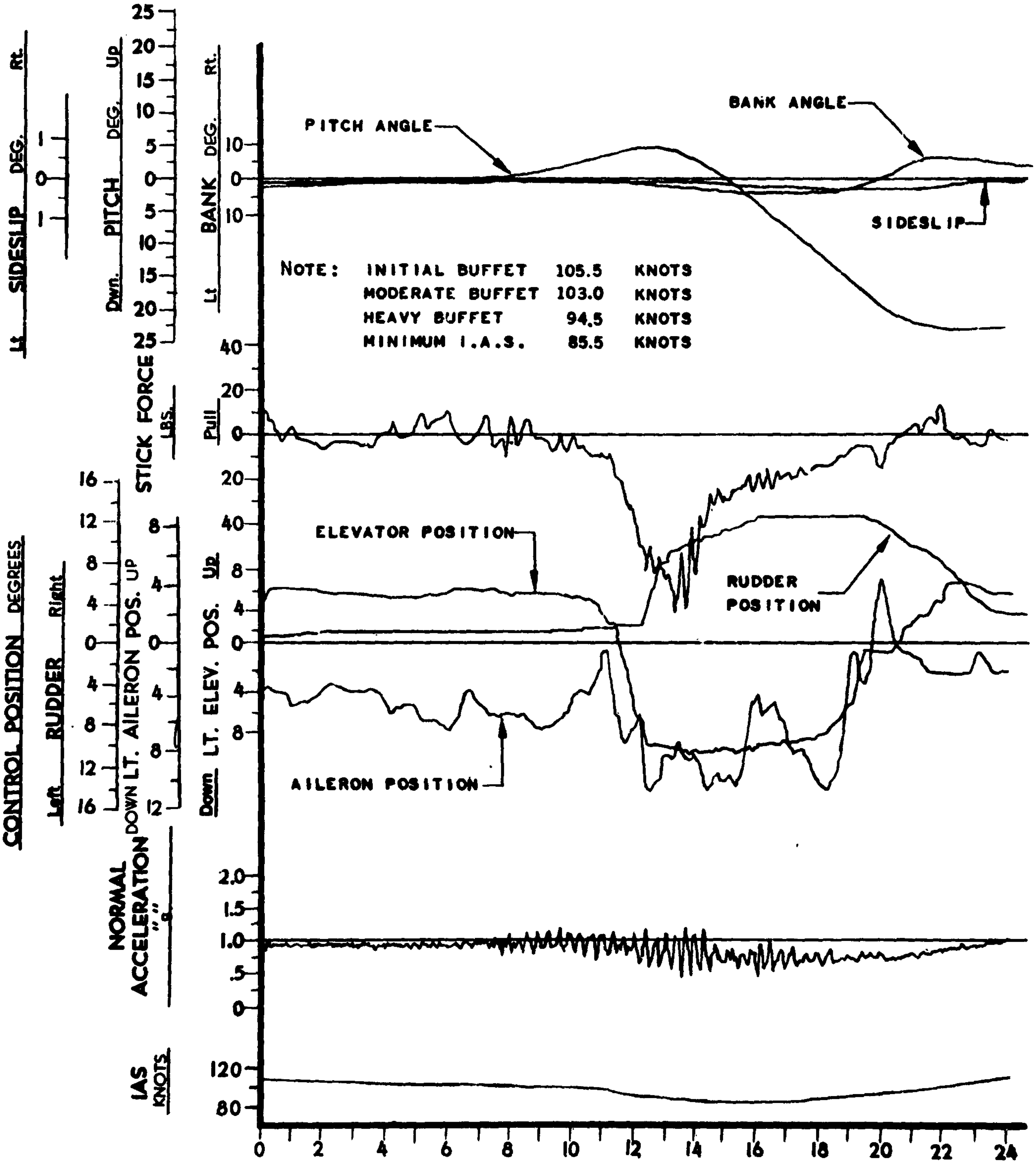


FIGURE NO. 240

STALL TIME HISTORY

B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S. 133 KNOTS ; ALTITUDE 18,800 FEET
C.G. 34.5 % MAC; WEIGHT 239,500 LBS.
AVG. N_2 8890 RPM; STABILIZER POSITION 4.8 DEG. N.D.
L. AIL. TAB 2.9 DEG. T. E. UP R. AIL. TAB. 3.5 DEG. T. E. DN.
RUDDER TAB 0 DEG.

EXTERNAL TANKS INSTALLED

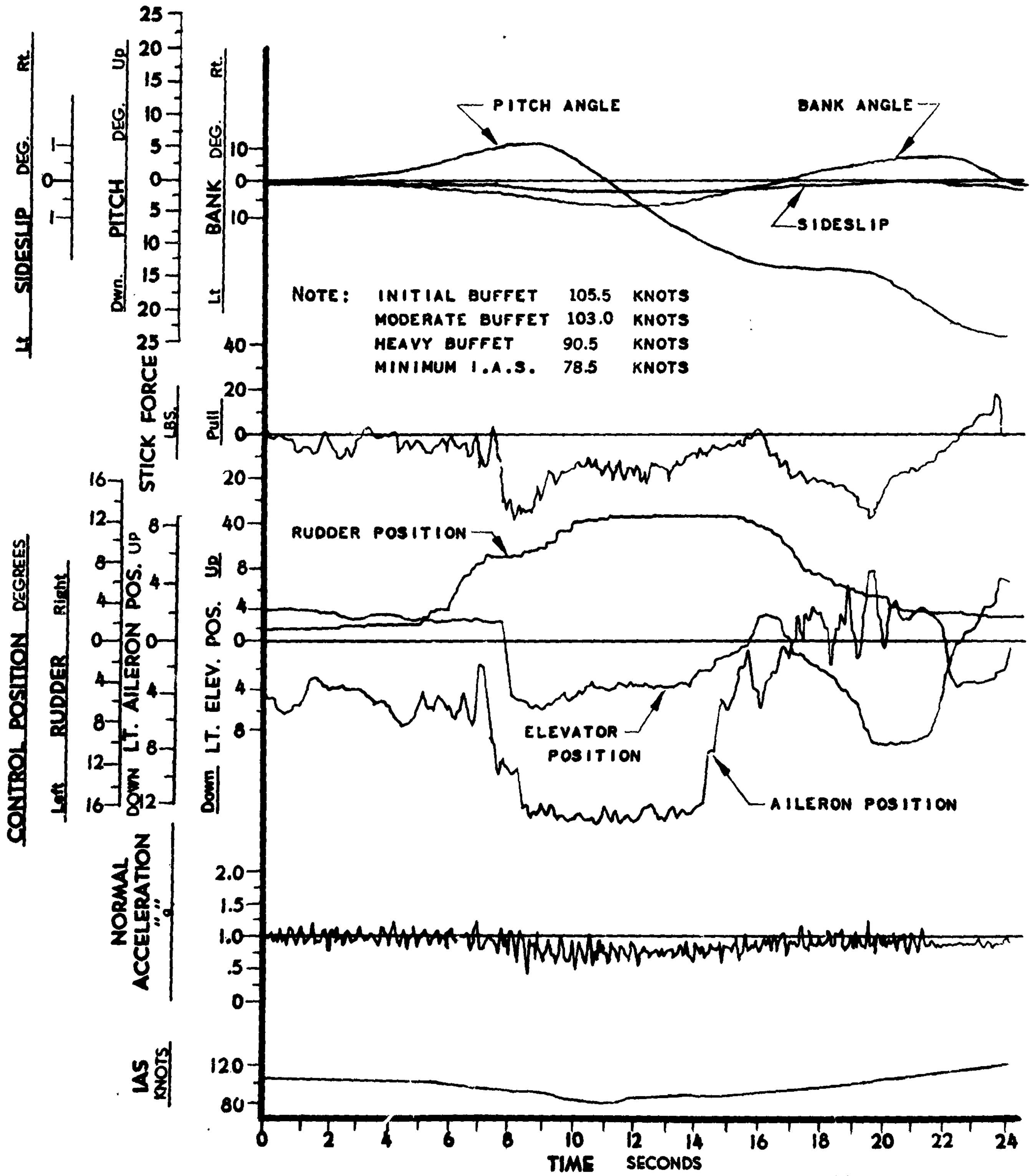


FIGURE NO. 241

STALL TIME HISTORY

B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S. 133 KNOTS ; ALTITUDE 18,800 FEET
C.G. 34.5 % MAC; WEIGHT 239,500 LBS.
AVG. N2 8890 RPM; STABILIZER POSITION 4.8 DEG. N.D.
L. AIL. TAB 2.9 DEG. T. E. UP R. AIL. TAB. 3.5 DEG. T. E. DN.
RUDDER TAB 0 DEG.

EXTERNAL TANKS INSTALLED

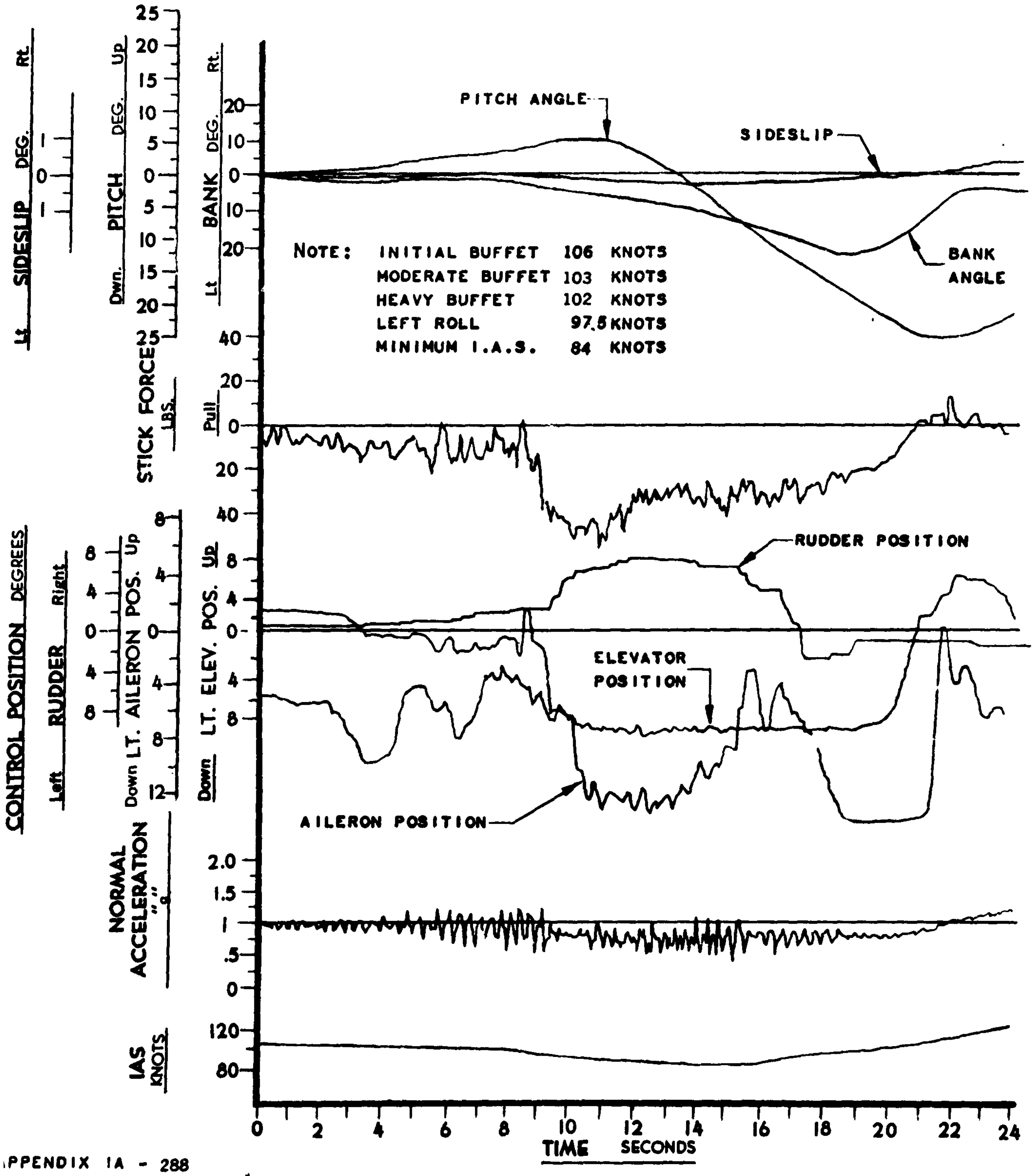


FIGURE NO. 242

STALL TIME HISTORY

B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION *

TRIM CONDITIONS

C.A.S. 160.5 KNOTS; ALTITUDE 14,100 FEET
C.G. 20.1 % MAC; WEIGHT 240,000 LBS.
AVG. N2 8370 RPM; STABILIZER POSITION 4.1 DEG. N.U.
L. AIL. TAB 1.3 DEG. T. E. UP R. AIL. TAB. 2.8 DEG. T. E. UP
RUDDER TAB 1.5 DEG. T. E. LT.

EXTERNAL TANKS INSTALLED

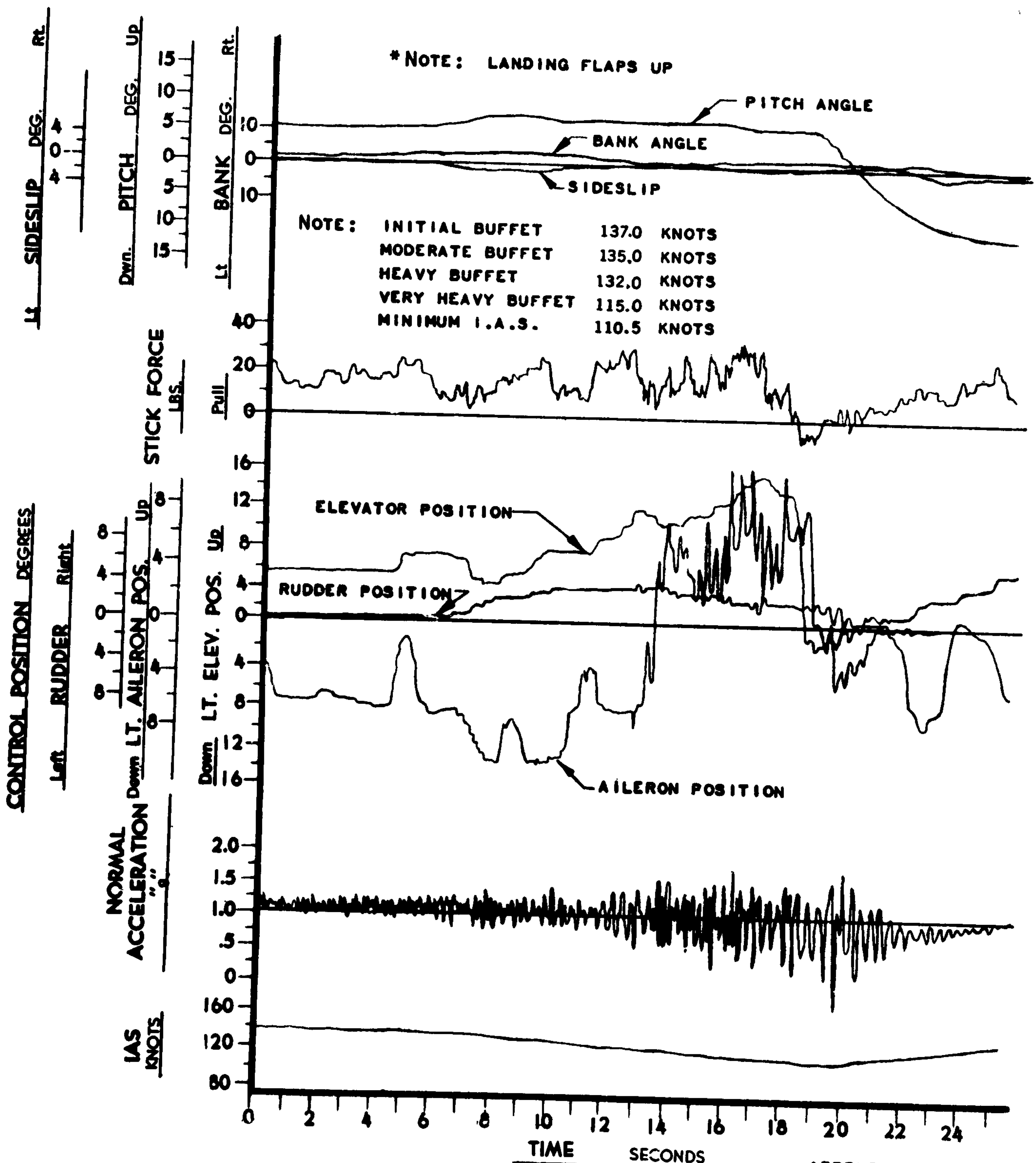


FIGURE NO. 243

STALL TIME HISTORY

B-52A, USAF NO. 52-003
LANDING CONFIGURATION

TRIM CONDITIONS

C.A.S. 127 KNOTS; ALTITUDE 17,000 FEET
C.G. 19.8 % MAC; WEIGHT 241,000 LBS.
AVG. N2 IDLE RPM; STABILIZER POSITION 3.7 DEG. N.U.
L. AIL. TAB 0.4 DEG. T. E. DN. R. AIL. TAB. 4.1 DEG. T. E. UP
RUDDER TAB 0.3 DEG. T. E. LT.

EXTERNAL TANKS INSTALLED

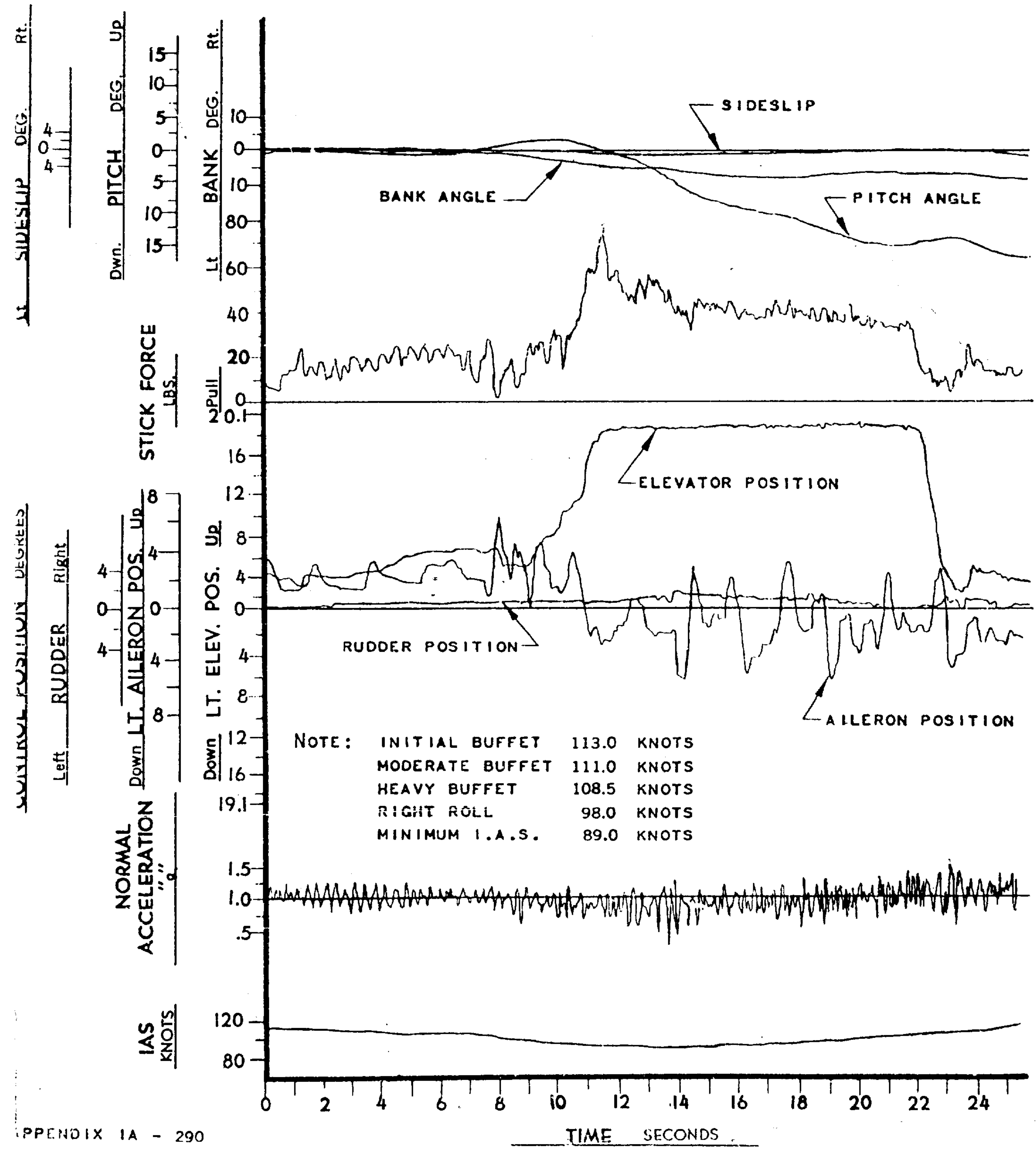


FIGURE NO. 244

STALL TIME HISTORY

B-52A, USAF NO. 52-003
LANDING CONFIGURATION

TRIM CONDITIONS

C.A.S.	130	KNOTS ;	ALTITUDE	19,500	FEET
C.G.	34.6	% MAC;	WEIGHT	243,500	LBS.
AVG. N2	IDLE	RPM;	STABILIZER POSITION	3.1	DEG. N.D.
L. AIL. TAB	1.2 DEG. T. E. UP		R. AIL. TAB.	1.5 DEG. T. E. DN.	
		RUDDER TAB	0.6 DEG. T. E. RT.		

EXTERNAL TANKS INSTALLED

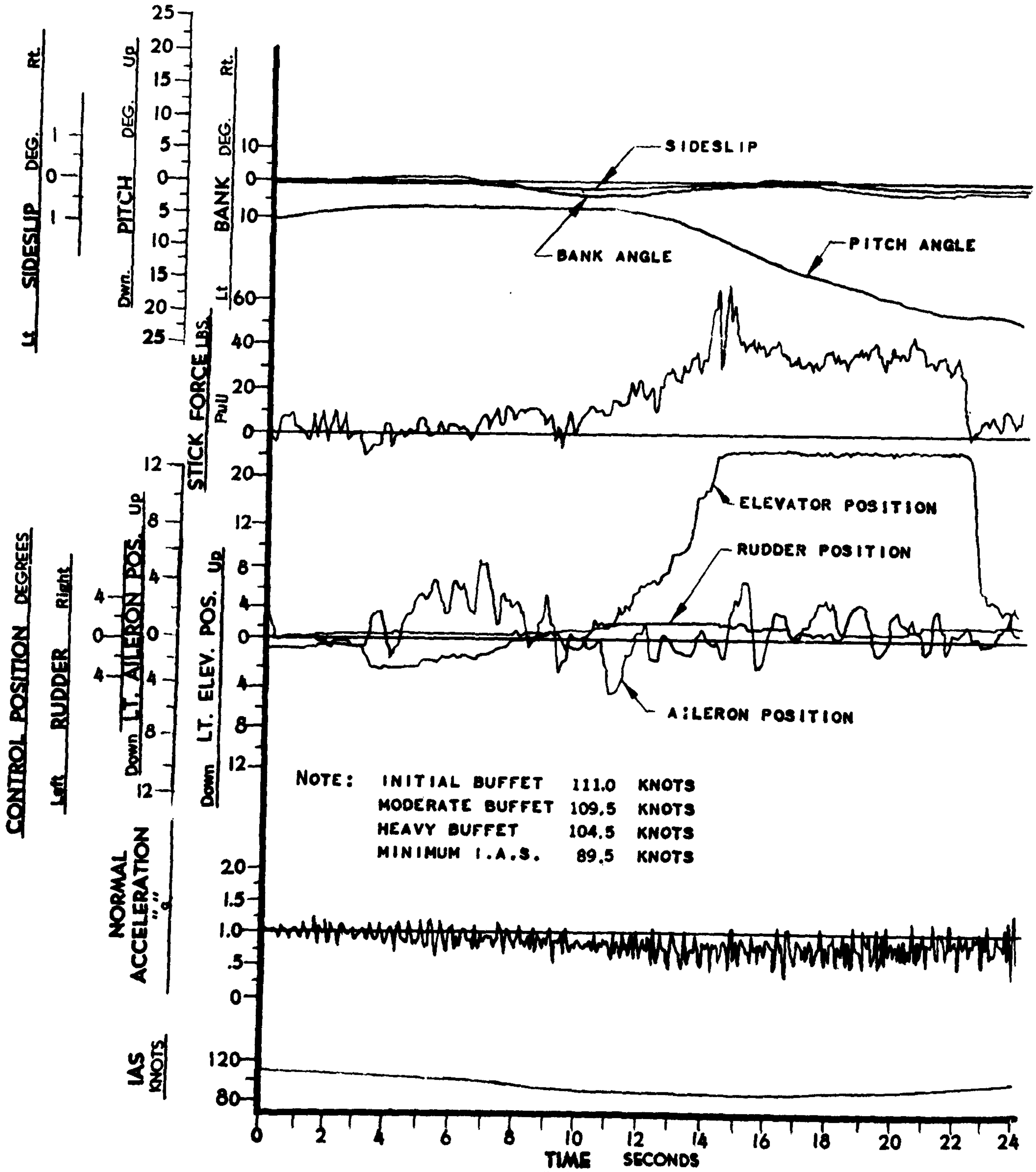


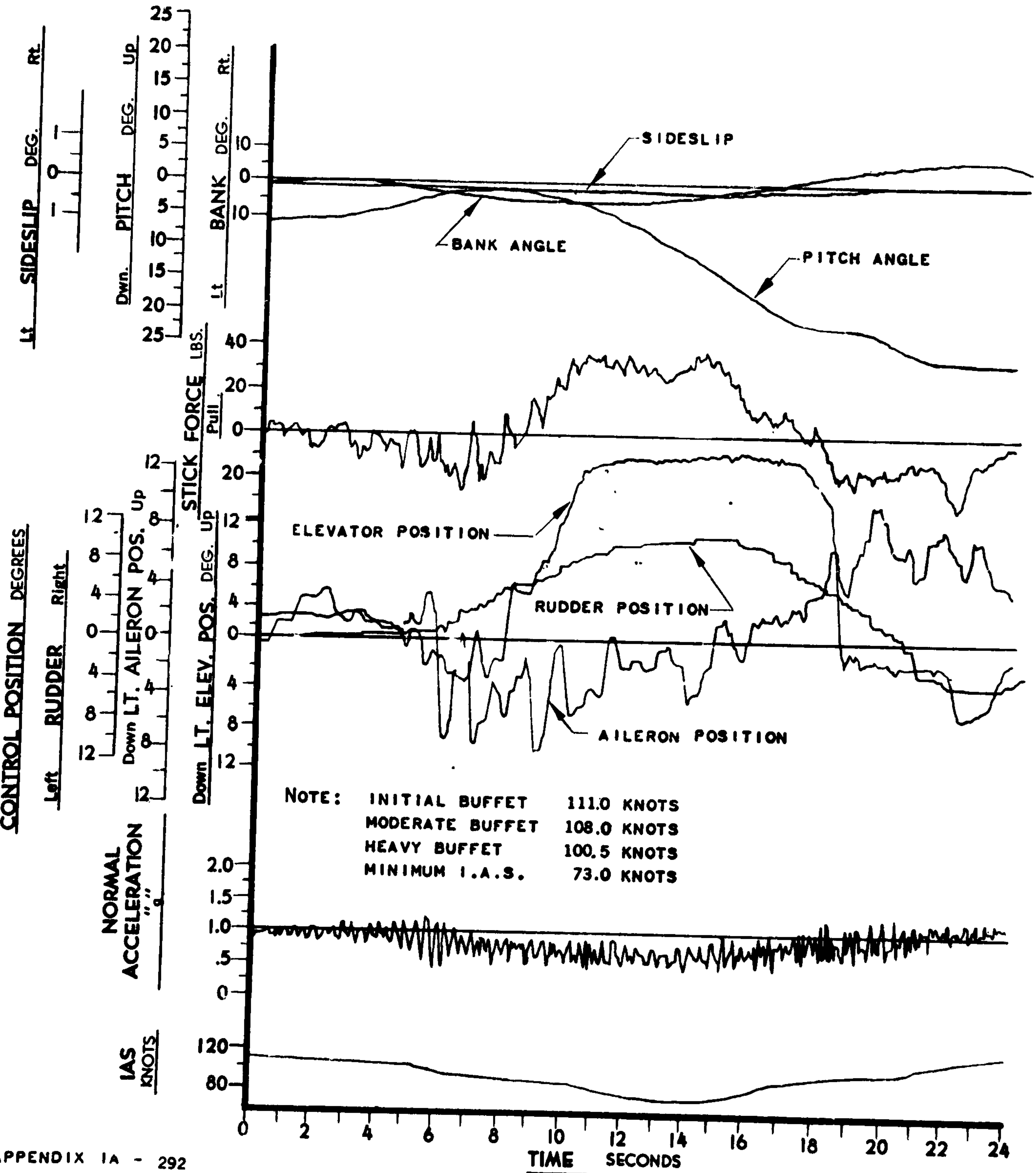
FIGURE NO. 245
STALL TIME HISTORY
B-52A, USAF NO. 52-003
LANDING CONFIGURATION

TRIM CONDITIONS

C.A.S.	130	KNOTS :	ALTITUDE	19,500	FEET
C.G.	34.6	% MAC;	WEIGHT	243,500	LBS.
AVG. N2	IDLE	RPM;	STABILIZER POSITION	3.1 DEG.	N.D.
L. AIL. TAB	1.2 DEG. T. E. UP		R. AIL. TAB.	1.5 DEG. T. E. DN.	

RUDDER TAB 0.6 DEG. T. E. RT.

EXTERNAL TANKS INSTALLED



NOTE: INITIAL BUFFET 111.0 KNOTS
MODERATE BUFFET 108.0 KNOTS
HEAVY BUFFET 100.5 KNOTS
MINIMUM I.A.S. 73.0 KNOTS

FIGURE NO. 246

STALL TIME HISTORY
B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 197.5 KNOTS; ALTITUDE 20,400 FEET
C.G. 20.9 % MAC; WEIGHT 267,300 LBS.
AVG. N2 8020 RPM; STABILIZER POSITION 1.7 DEG. N.U.
L. AIL. TAB 0.2 DEG. T. E. DN. R. AIL. TAB. 5.1 DEG. T. E. UP
RUDDER TAB 1.2 DEG. T. E. LT.

EXTERNAL TANKS INSTALLED

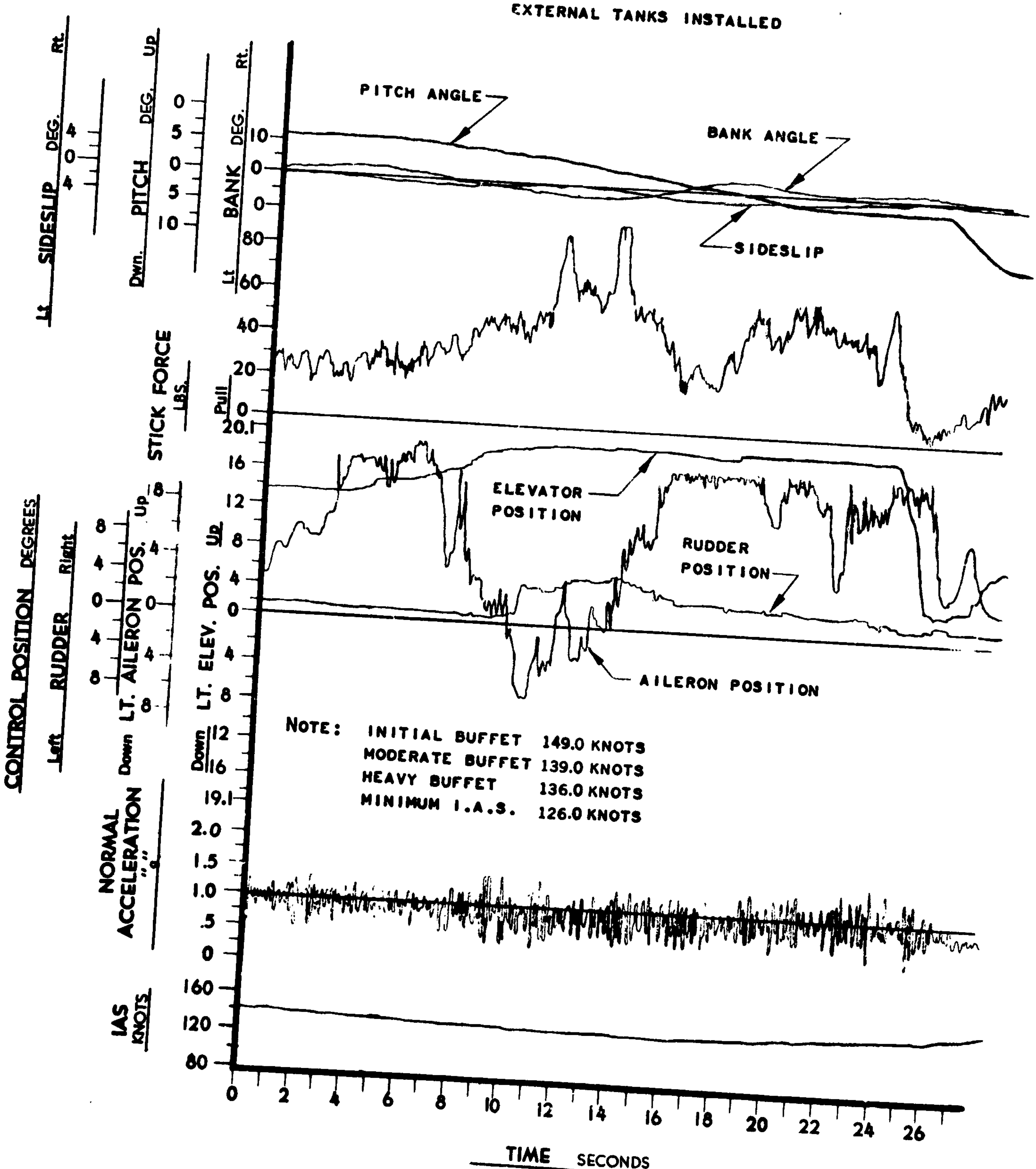


FIGURE NO. 247

STALL TIME HISTORY
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 197.5 KNOTS; ALTITUDE 25,000 FEET
C.G. 19.6 % MAC; WEIGHT 262,800 LBS.
AVG. N2 8460 RPM; STABILIZER POSITION 1.9 DEG. N.U.
L. AIL. TAB 0 DEG. R. AIL. TAB. 4.8 DEG. T. E. UP
RUDDER TAB 1.8 DEG. T. E. LT.

EXTERNAL TANKS INSTALLED

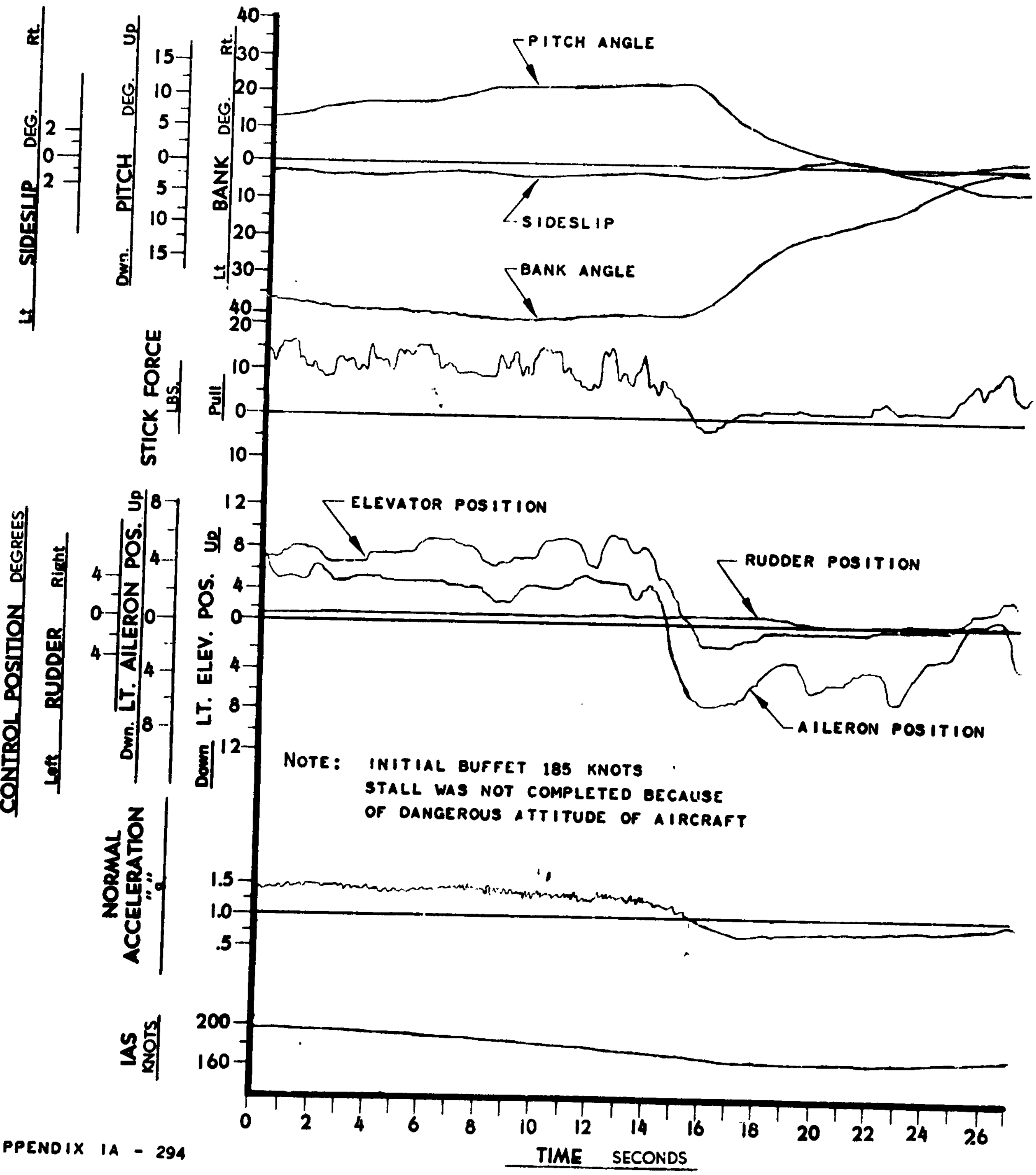


FIGURE NO. 248

STALL TIME HISTORY

B-52A, USAF NO. 52-003
CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 205 KNOTS ; ALTITUDE 19800 FEET
C.G. 31.1 % MAC; WEIGHT 282000 LBS.
AVG. N2 8400 RPM; STABILIZER POSITION 0.7 DEG. N.D.
L. AIL. TAB 1.0 DEG. T. E. DN. R. AIL. TAB 0.2 DEG. T. E. UP
RUDDER TAB 0.4 DEG. T. E. RT.

EXTERNAL TANKS INSTALLED

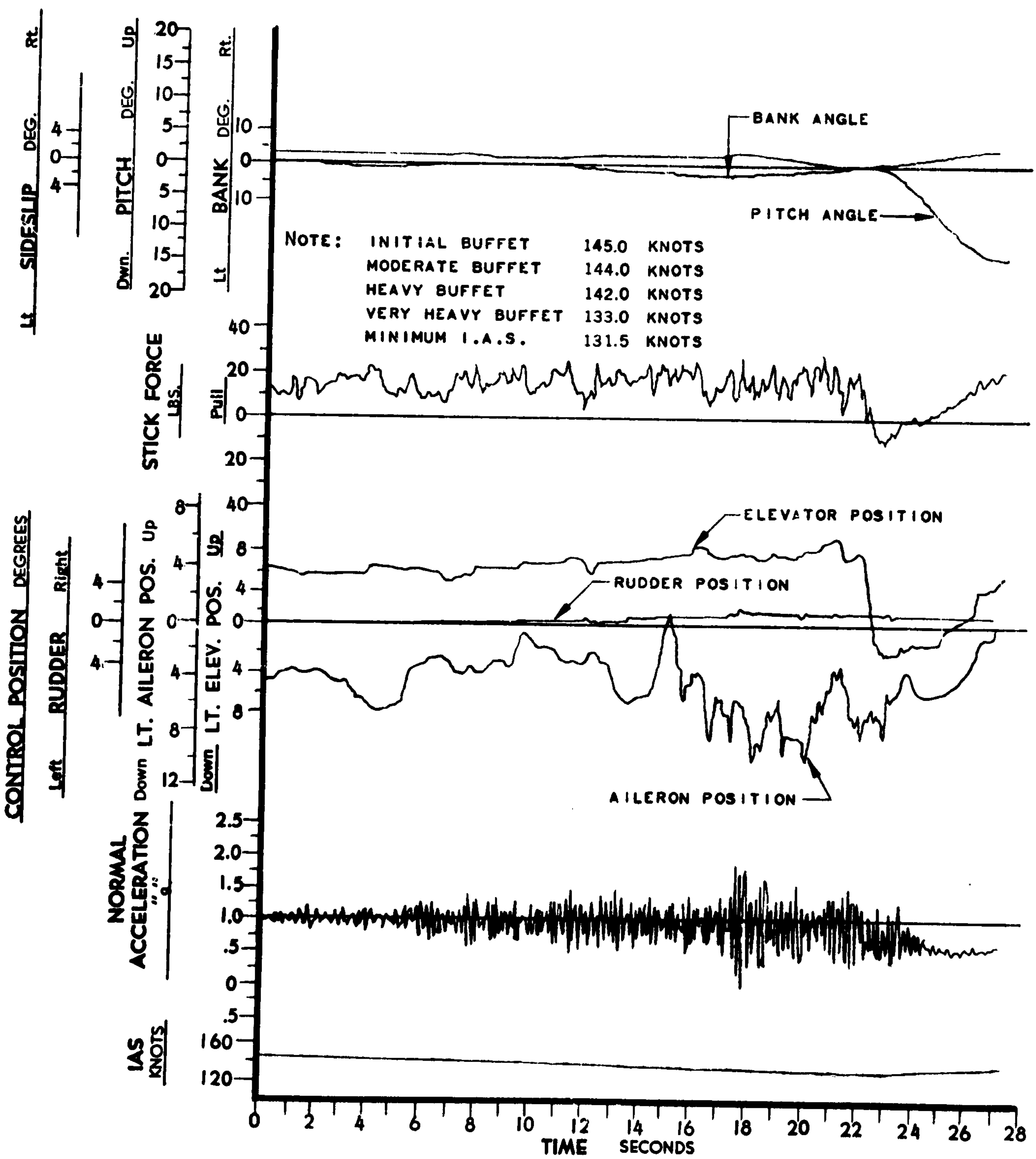


FIGURE NO. 249

STALL TIME HISTORY

B-52A, USAF NO. 52-003
CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 205 KNOTS ; ALTITUDE 19800 FEET
C.G. 31.1 % MAC; WEIGHT 282000 LBS.
AVG. N2 4008 RPM; STABILIZER POSITION 0.7 DEG. N.D.
L. AIL. TAB 1.0 DEG. T. E. DN. R. AIL. TAB 0.2 DEG. T. E. UP
RUDDER TAB 0.4 DEG. T. E. RT.

EXTERNAL TANKS INSTALLED

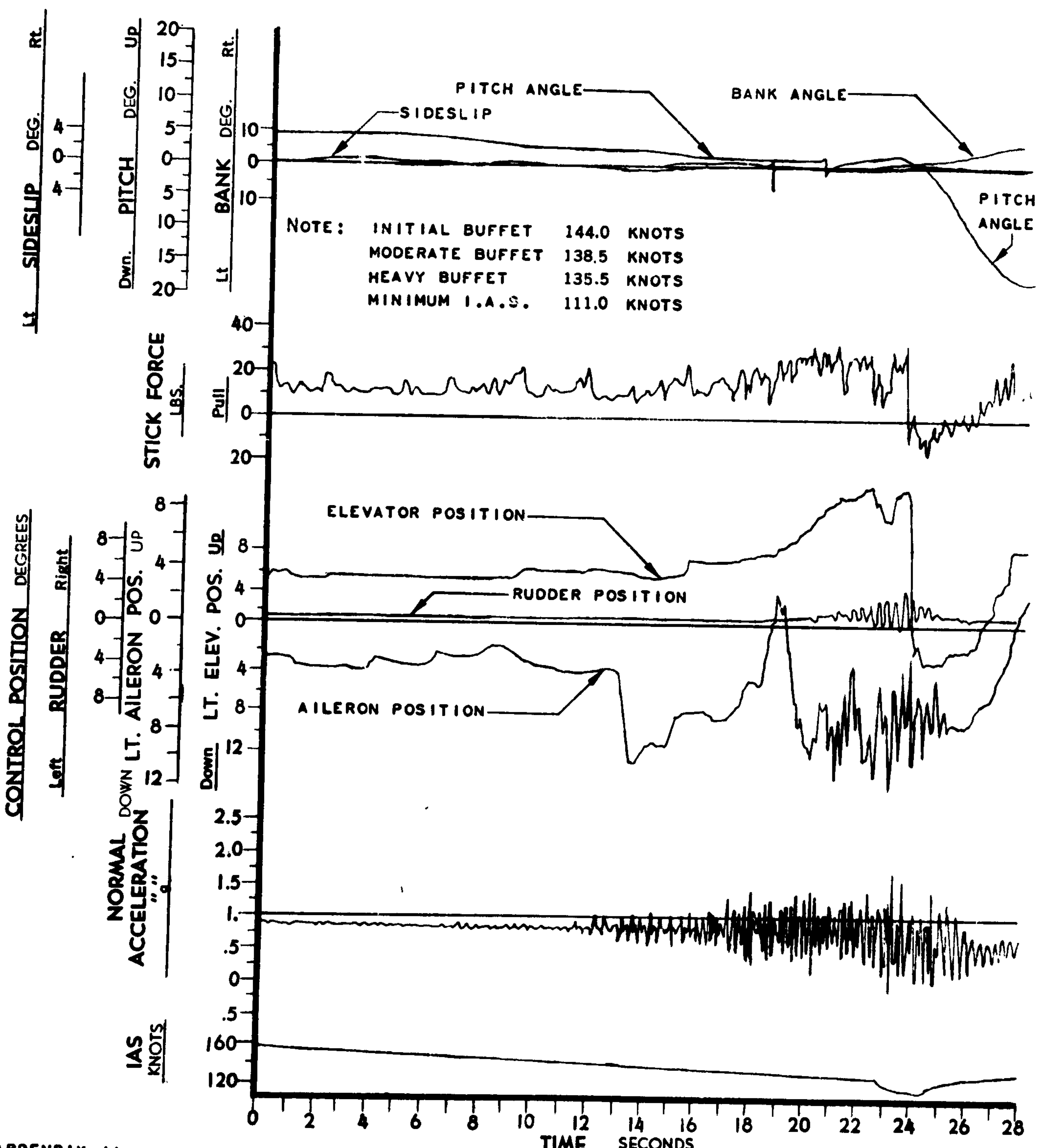


FIGURE NO. 250

STALL TIME HISTORY

B-52A, USAF NO. 52-003
CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S.	205	KNOTS ;	ALTITUDE	19,800	FEET
C.G.	31.1	% MAC;	WEIGHT	282,000	LBS.
AVG. N2	8400	RPM*	STABILIZER POSITION	0.7 DEG.	N.D.

L. AIL. TAB 1.0 DEG. T. E. DN. R. AIL. TAB. 0.2 DEG. T. E. UP
RUDDER TAB 0.4 DEG. T. E. RT.

EXTERNAL TANKS INSTALLED

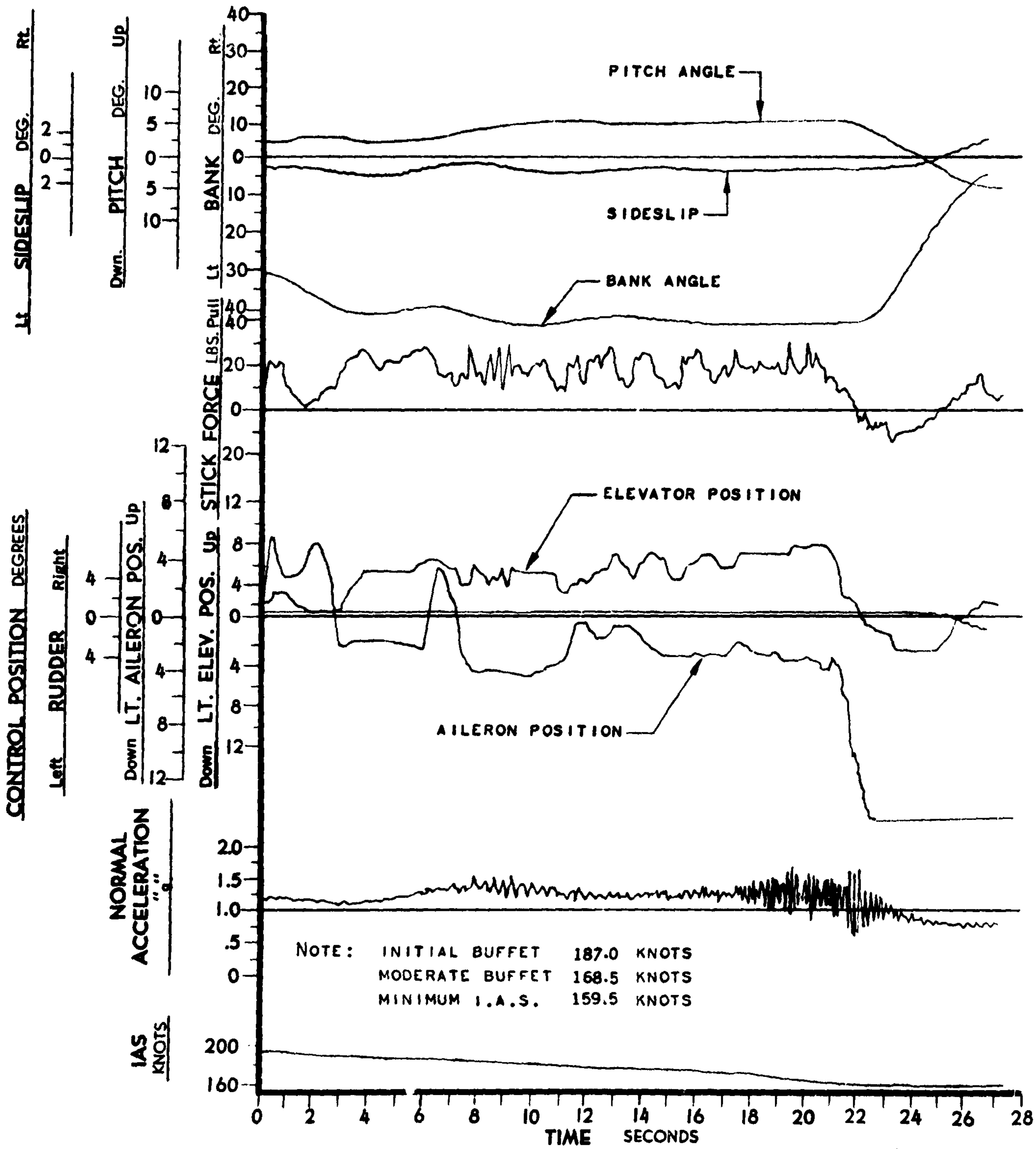


FIGURE NO. 251

STALL TIME HISTORY

B-52A, USAF NO. 52-003
CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 305 KNOTS; ALTITUDE 20300 FEET
C.G. 31.6 % MAC; WEIGHT 279000 LBS.
AVG. N_2 8900 RPM; STABILIZER POSITION 2.5 DEG. N.D.
L. AIL. TAB 0 DEG. R. AIL. TAB. 0.2 DEG. T. E. DN.
RUDDER TAB 0.4 DEG. T. E. RT

EXTERNAL TANKS INSTALLED

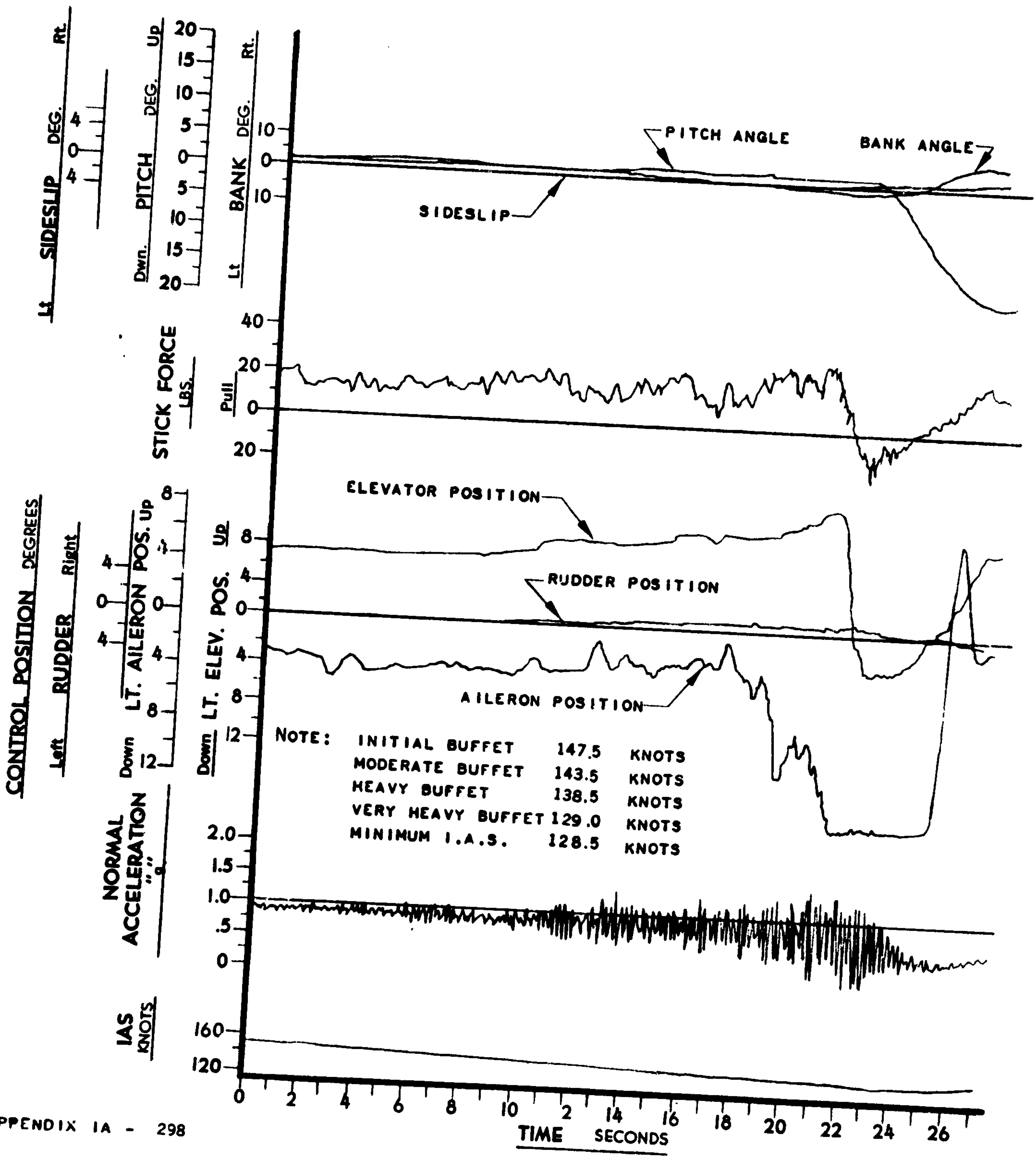


FIGURE NO. 252

STALL TIME HISTORY

B-52A, USAF NO. 52-003
CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 207.5 KNOTS; ALTITUDE 47,700 FEET
C.G. 19.1 % MAC; WEIGHT 252,[illegible]00 LBS.
AVG. N_2 9140 RPM; STABILIZER POSITION 1.0 DEG. N.U.
L. AIL. TAB 2.5 DEG. T. E. UP R. AIL. TAB. 1.6 DEG. T. E. DN.
RUDDER TAB 1.8 DEG. T. E. LT.

NO EXTERNAL TANKS INSTALLED

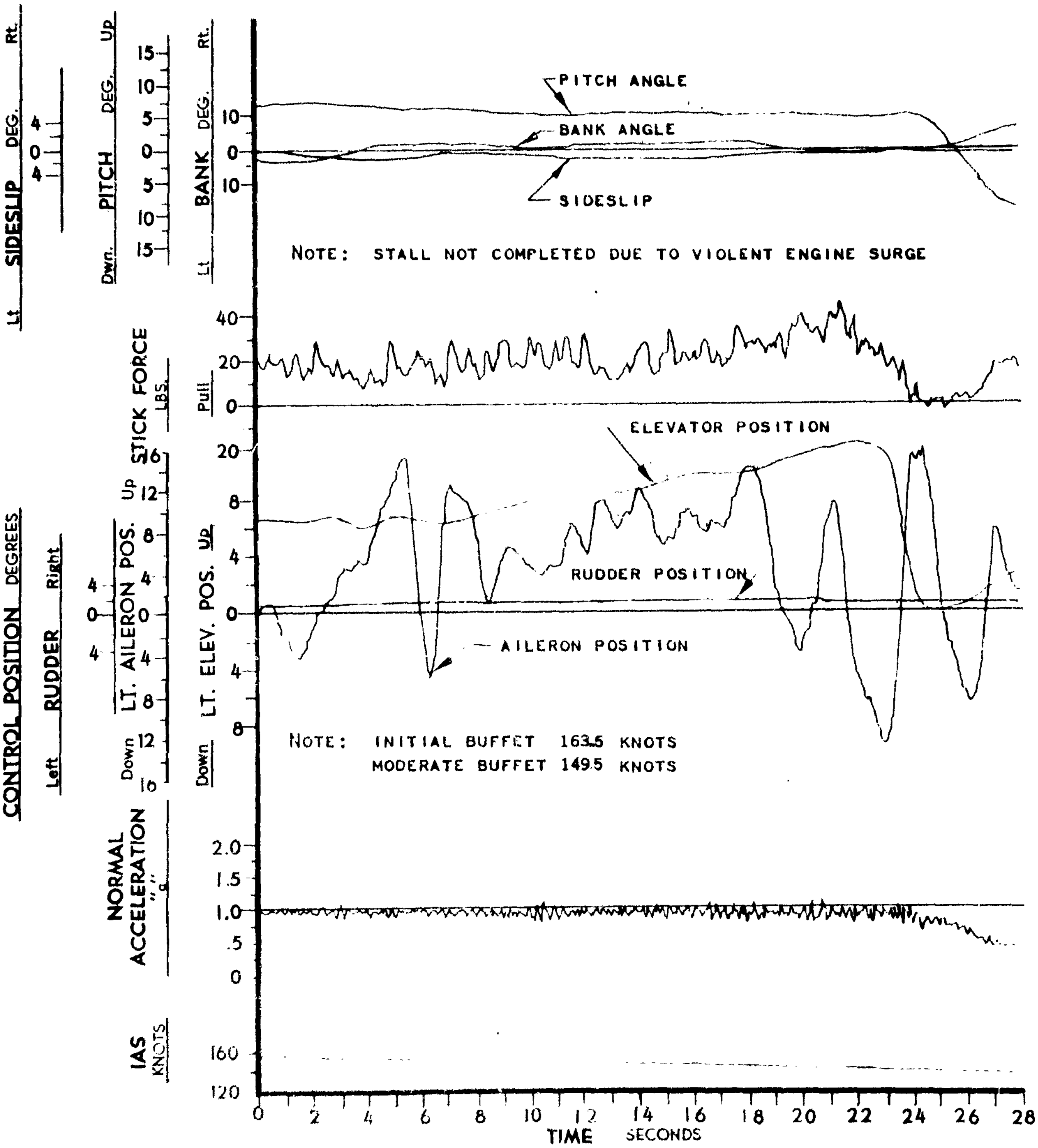


FIGURE NO. 253

STALL TIME HISTORY

B-52A, USAF NO. 52-003
CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 207.5 KNOTS; ALTITUDE 47,700 FEET
C.G. 19.1 % MAC; WEIGHT 252,500 LBS.
AVG. N_2 9140 RPM; STABILIZER POSITION 1.0 DEG. N.U.
L. AIL. TAB 2.5 DEG. T. E. UP R. AIL. TAB. 1.6 DEG. T. E. DN.
RUDDER TAB 1.8 DEG. T. E. LT.

NO EXTERNAL TANKS INSTALLED

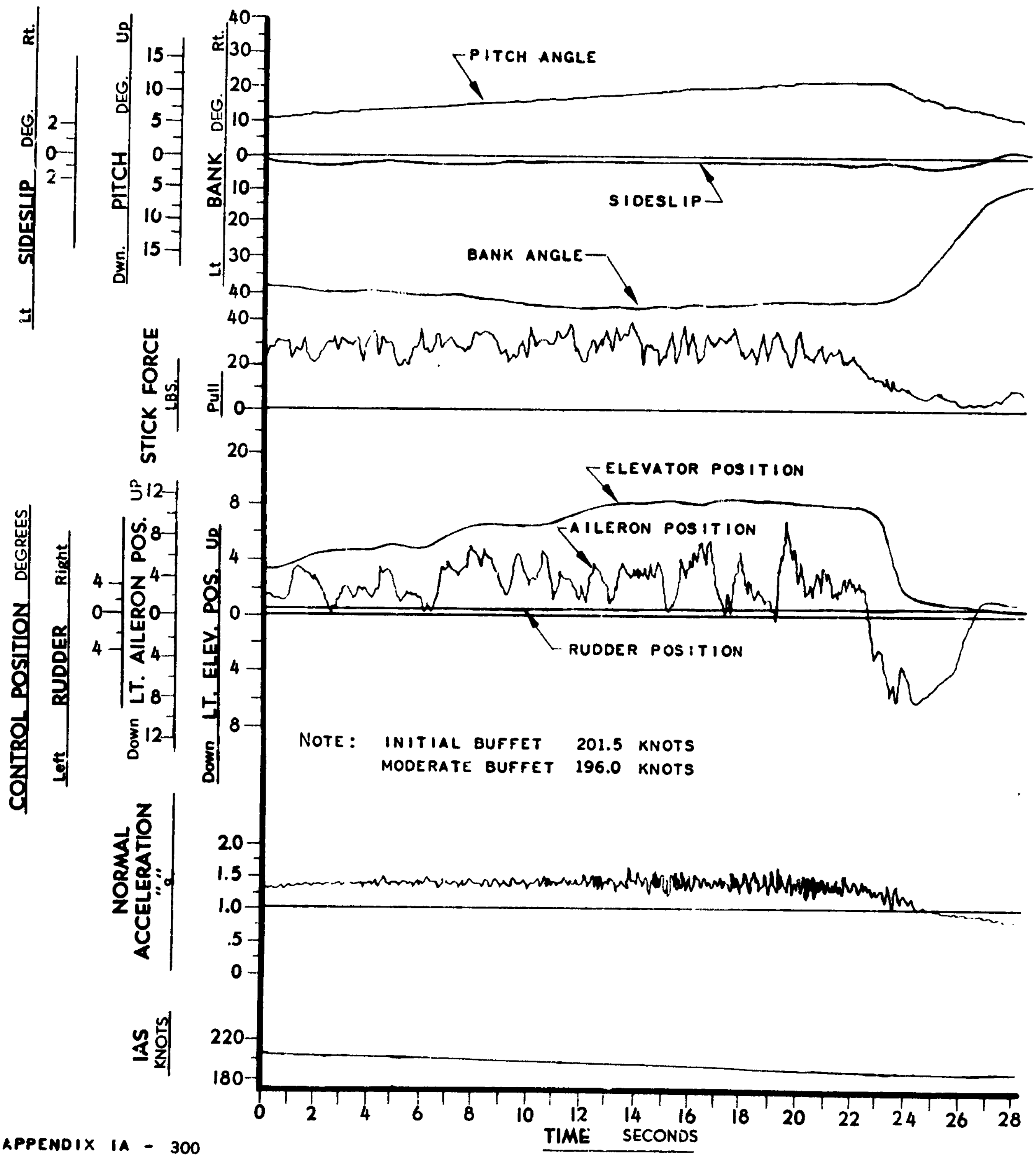


FIGURE NO. 254

STALL TIME HISTORY

B-52A, USAF NO. 52-003
CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S.	187	KNOTS:	ALTITUDE	47,200	FEET
C.G.	34.1	% MAC;	WEIGHT	239,000	LBS.
AVG. N2	8910	RPM;	STABILIZER POSITION	0.8	DEG. N.D.

L. AIL. TAB 1.3 DEG. T. E. DN. R. AIL. TAB. 5.1 DEG. T. E. UP

RUDDER TAB 2.4 DEG. T. E. LT.

NO EXTERNAL TANKS INSTALLED

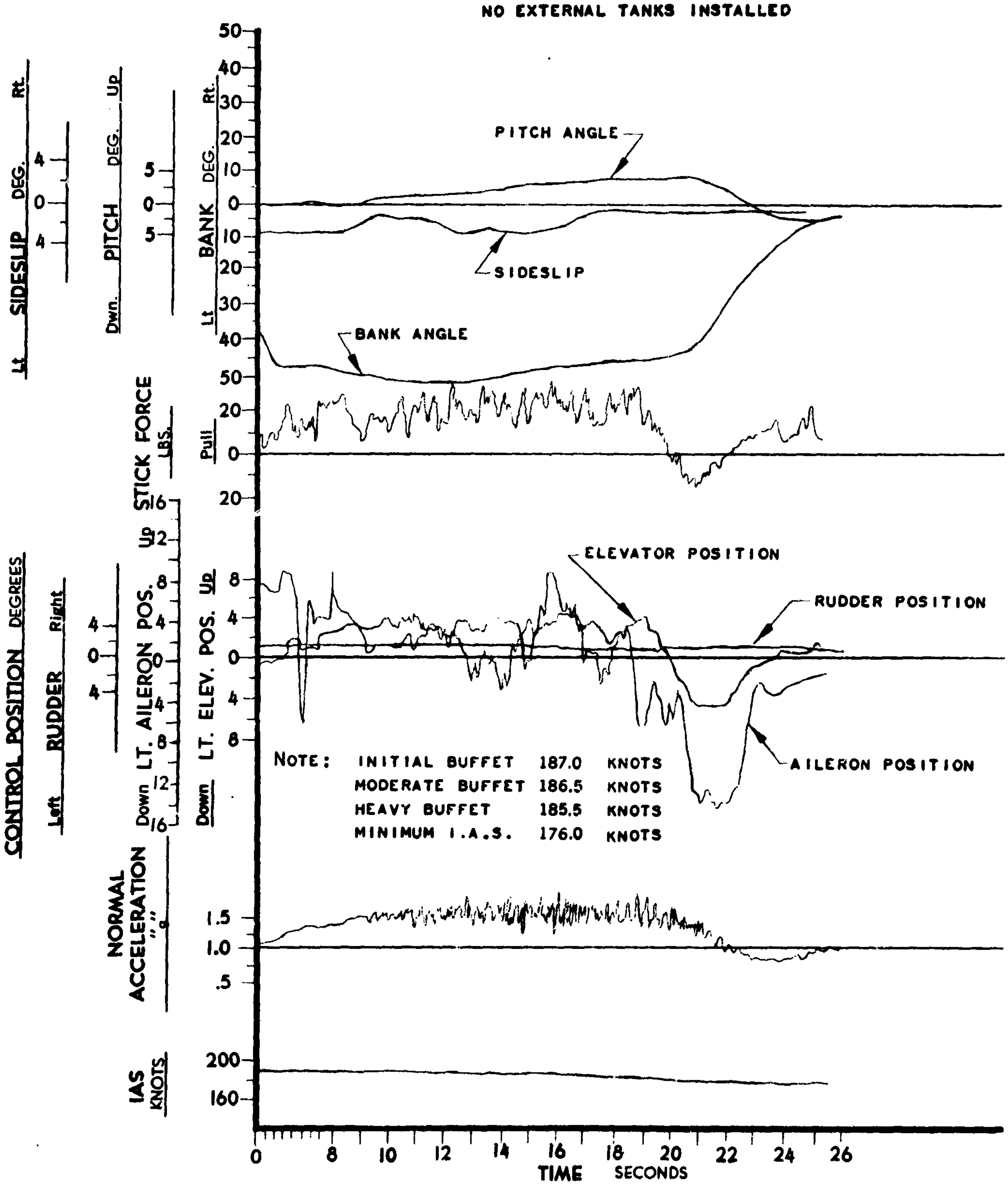


FIGURE NO. 255

STALL TIME HISTORY
B-52A, USAF NO. 52-003
POWER CONFIGURATION

TRIM CONDITIONS

C.A.S. 220 KNOTS : ALTITUDE 46,300 FEET
C.G. 34.2 % MAC; WEIGHT 238,500 LBS.
AVG. N_2 8940 RPM; STABILIZER POSITION 0.3 DEG. N.U.
L. AIL. TAB 0.6 DEG. T. E. DN. R. AIL. TAB. 4.1 DEG. T. E. UP
RUDDER TAB 2.7 DEG. T. E. LT.

NO EXTERNAL TANKS INSTALLED

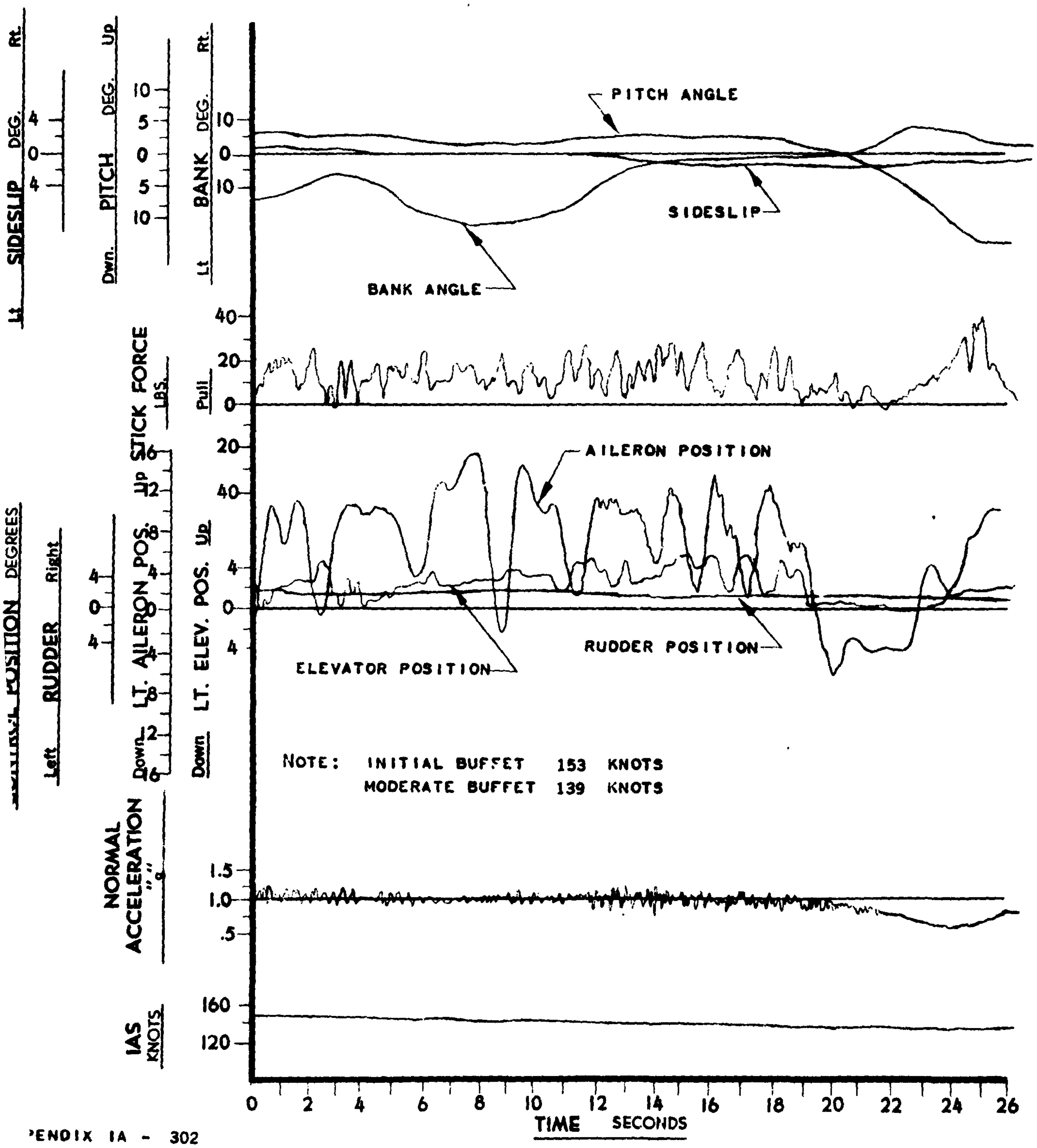


FIGURE NO. 256

STALL TIME HISTORY

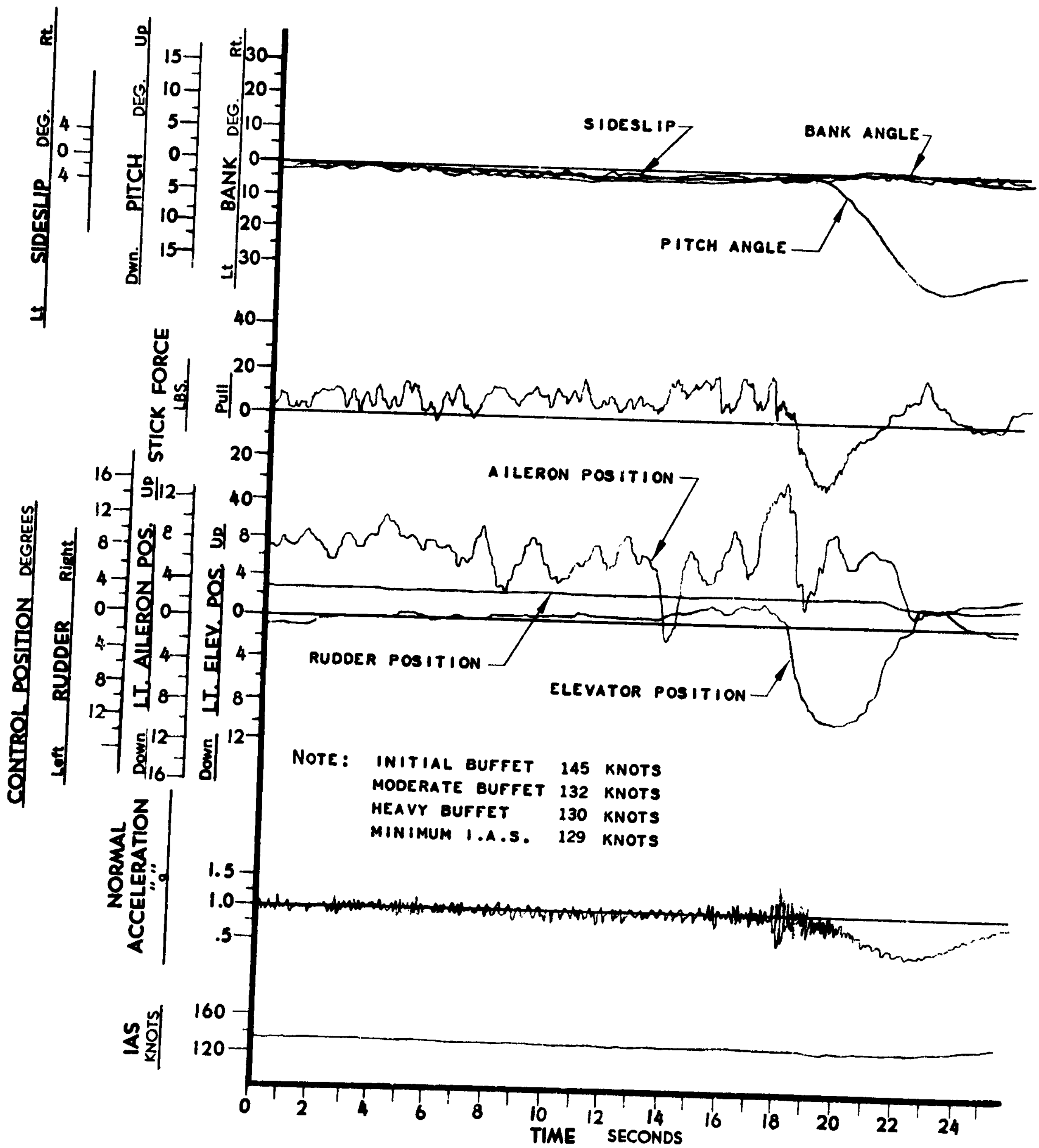
B-52A, USAF NO. 52-003

GLIDE CONFIGURATION

TRIM CONDITIONS

C.A.S. 162.5 KNOTS ; ALTITUDE 49,500 FEET
C.G. 33.7 % MAC; WEIGHT 224,500 LBS.
AVG. N2 IDLE RPM; STABILIZER POSITION 0.2 DEG. N.D.
L. AIL. TAB 0.2 DEG. T. E. DN. R. AIL. TAB. 0.2 DEG. T. E. DN.
RUDDER TAB 3.0 DEG. T. E. LT.

NO EXTERNAL TANKS INSTALLED



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FOR CONVENIENCE OF

PRESENTING PLOTS

MANEUVERING FLIGHT CHARACTERISTICS

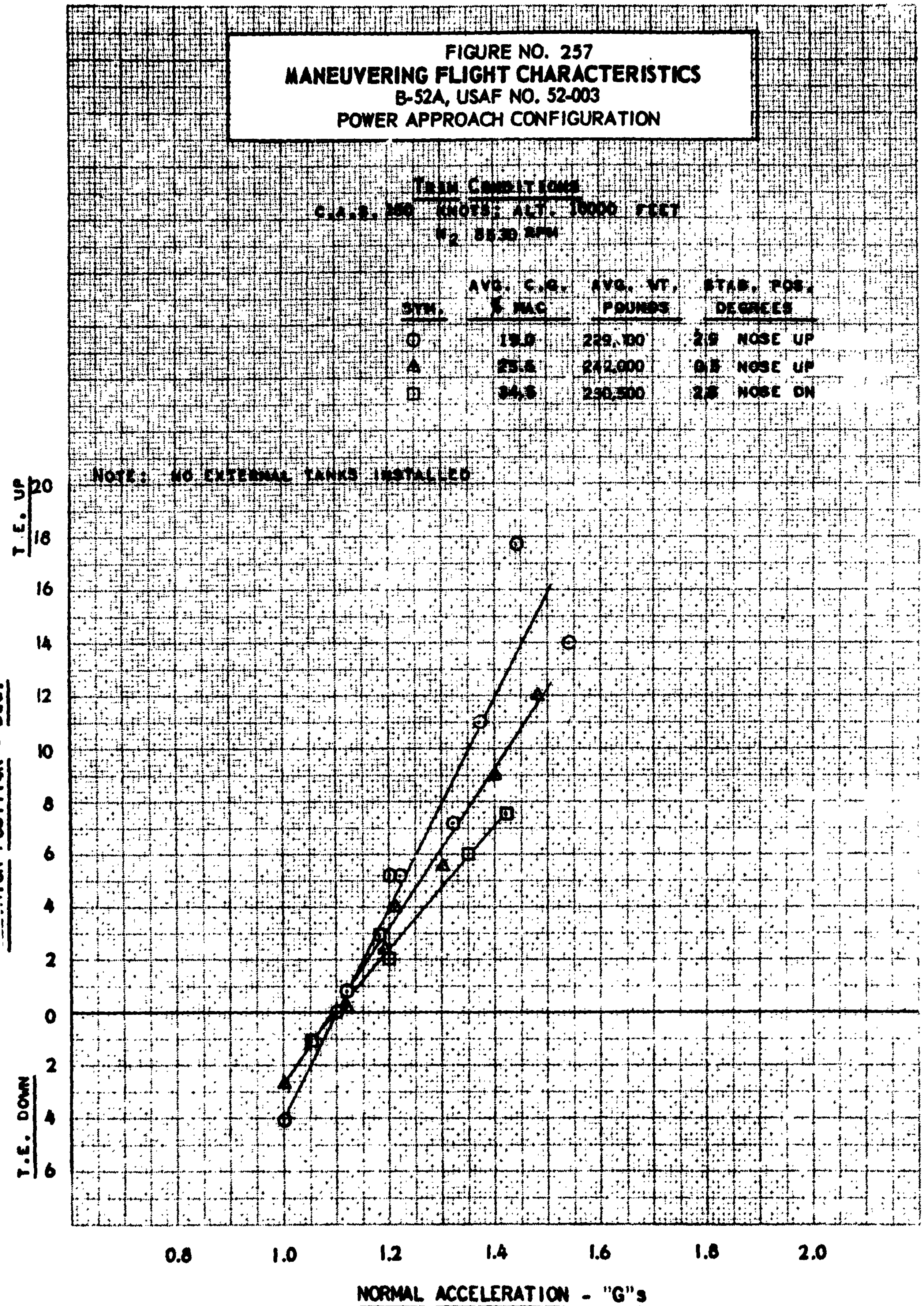


FIGURE NO. 257

FIGURE NO. 258
MANEUVERING FLIGHT CHARACTERISTICS
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION

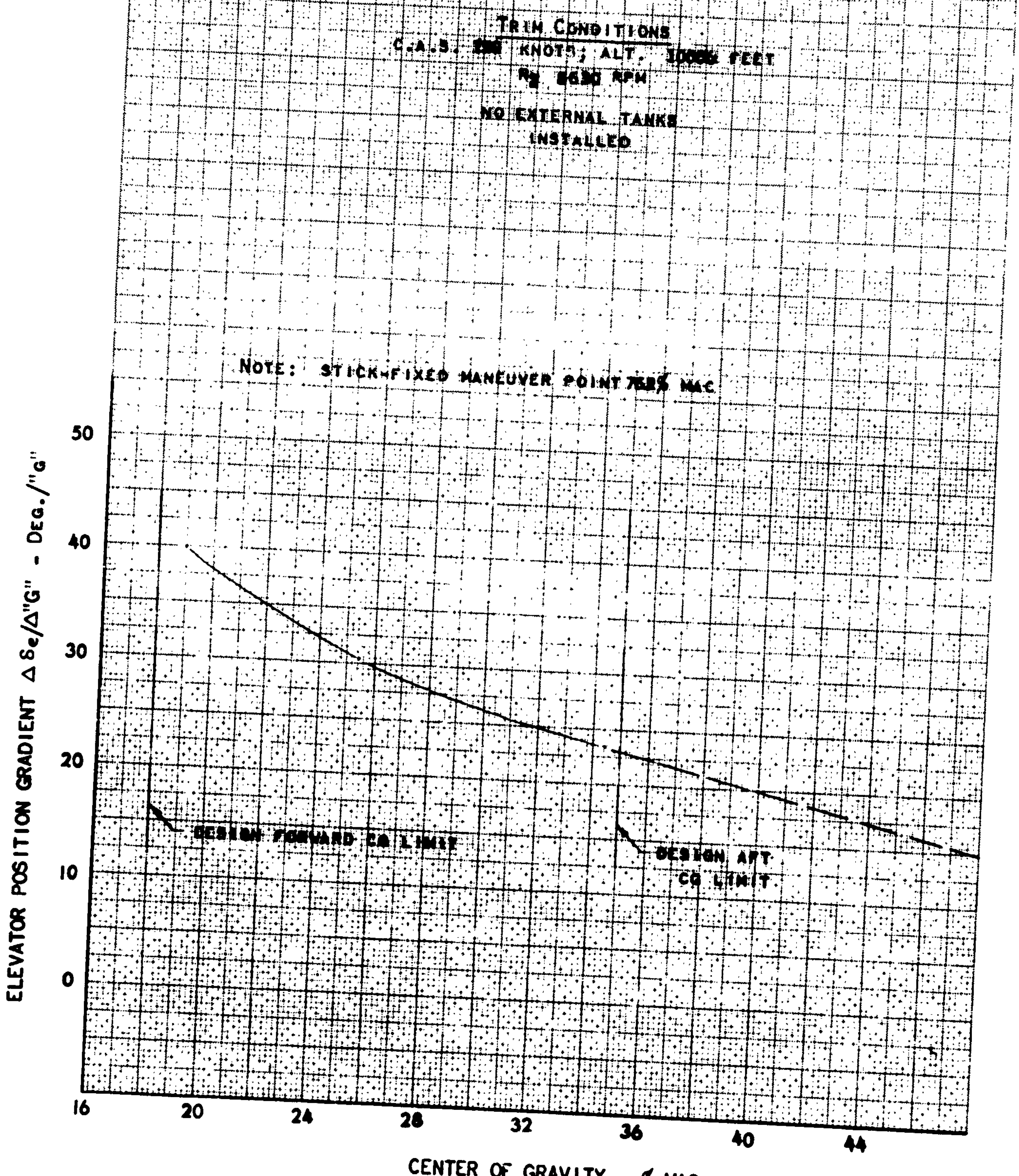
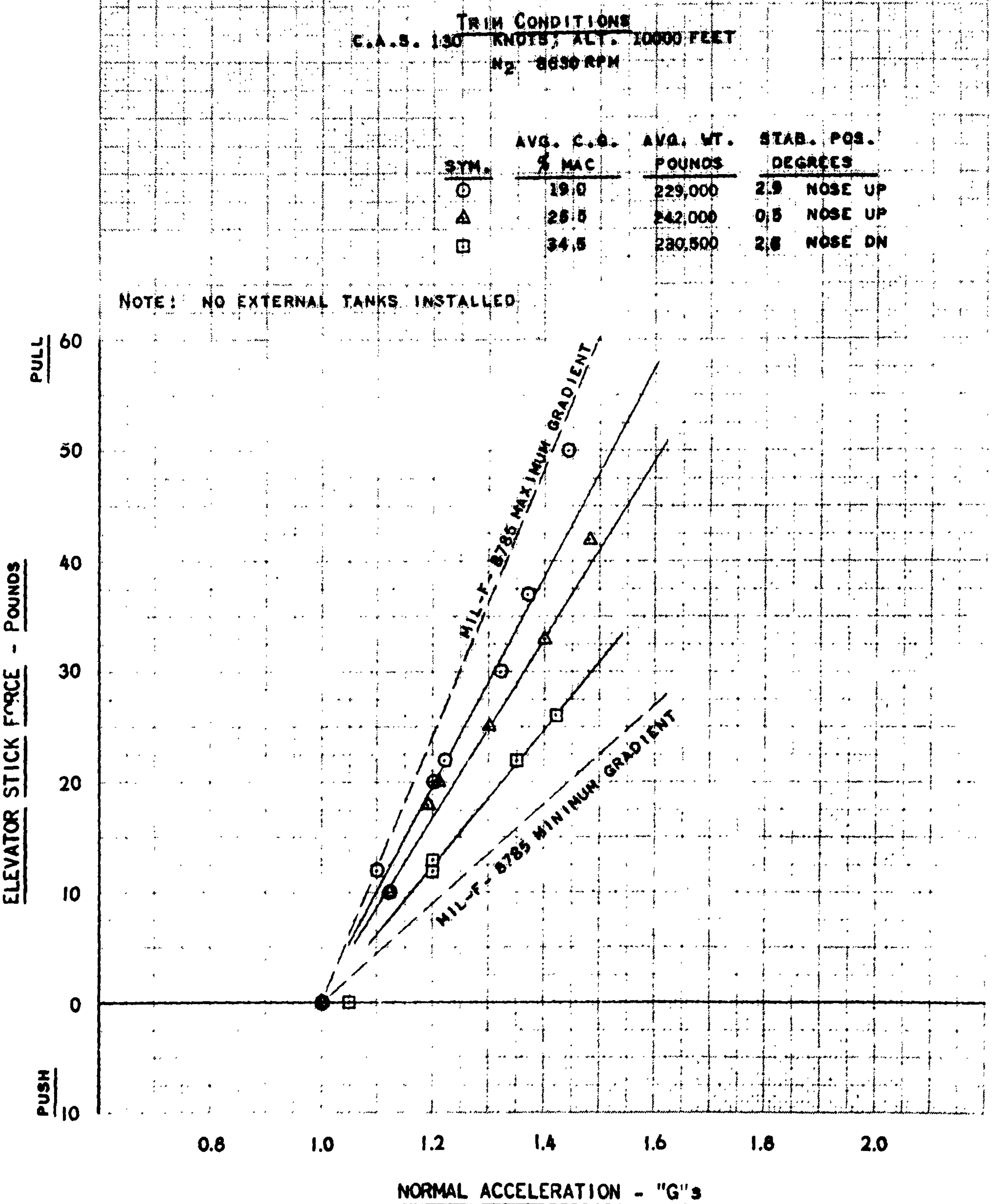


FIGURE NO. 259
MANEUVERING FLIGHT CHARACTERISTICS
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION



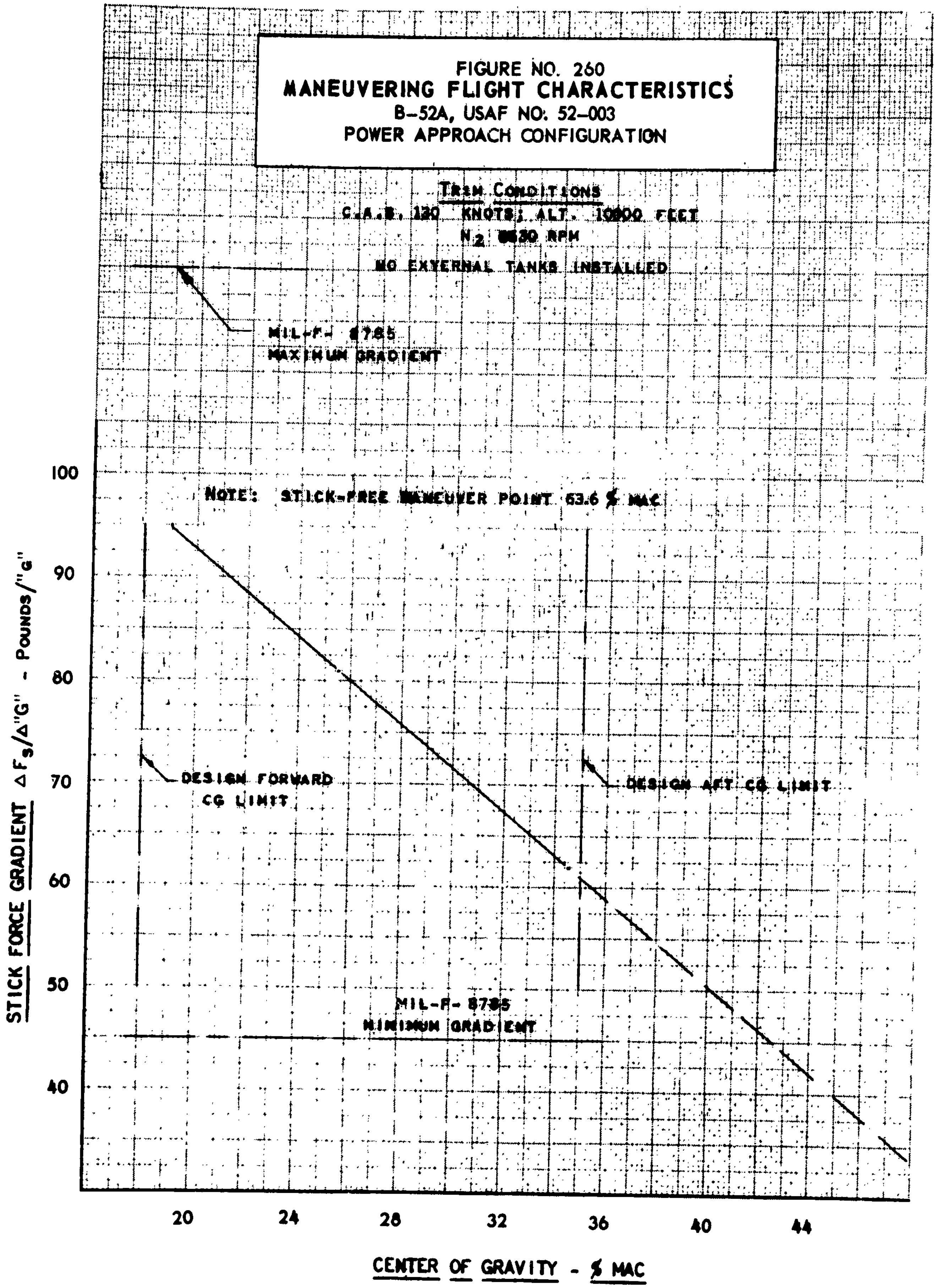


FIGURE NO. 260
MANEUVERING FLIGHT CHARACTERISTICS
B-52A, USAF NO: 52-003
POWER APPROACH CONFIGURATION
TRIM CONDITIONS
C.A.S. 120 KNOTS; ALT. 10000 FEET
NO EXTERNAL TANKS INSTALLED
MIL-F- 8785
MAXIMUM GRADIENT
NOTE: STICK-FREE MANEUVER POINT 63.6 % MAC
DESIGN FORWARD
CG LIMIT
DESIGN AFT CG LIMIT
MIL-F- 8785
MINIMUM GRADIENT
100
90
80
70
60
50
40
STICK FORCE GRADIENT $\Delta F_s/\Delta$"G" - POUNDS/"G"
20
24
28
32
36
40
44
CENTER OF GRAVITY - % MAC

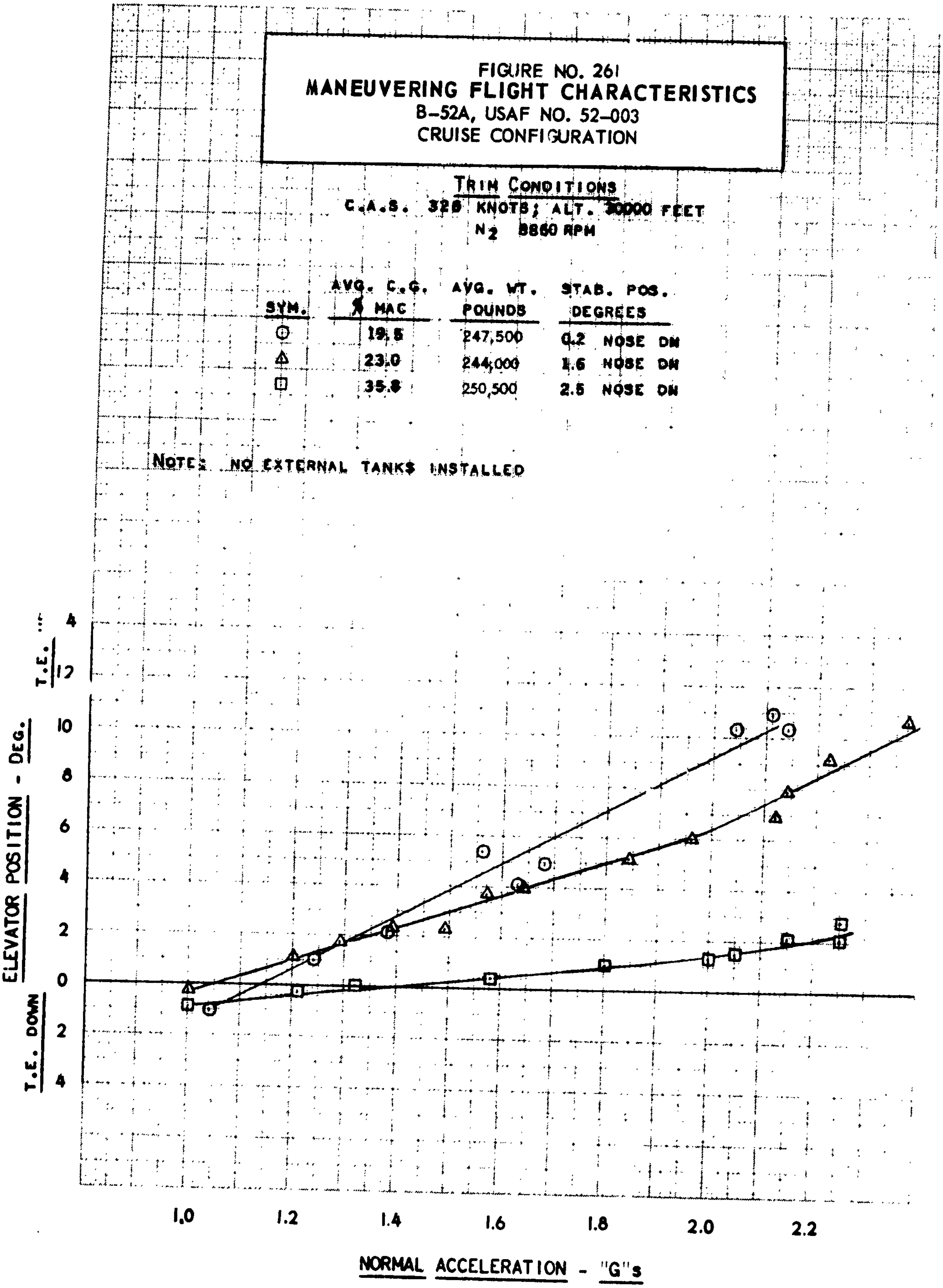


FIGURE NO. 261
MANEUVERING FLIGHT CHARACTERISTICS
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION
TRIM CONDITIONS
C.A.S. 328 KNOTS; ALT. 30000 FEET
N2 8860 RPM
SYM.
AVG. C.G. % MAC
AVG. WT. POUNDS
STAB. POS. DEGREES
19.5
247,500
0.2 NOSE DN
23.0
244,000
1.6 NOSE DN
35.8
250,500
2.5 NOSE DN
NOTE: NO EXTERNAL TANKS INSTALLED
T.E. UP
ELEVATOR POSITION - DEG.
T.E. DOWN
4
12
10
8
6
4
2
0
2
4
1.0
1.2
1.4
1.6
1.8
2.0
2.2
NORMAL ACCELERATION - "G"s

FIGURE NO. 262
MANEUVERING FLIGHT CHARACTERISTICS
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION

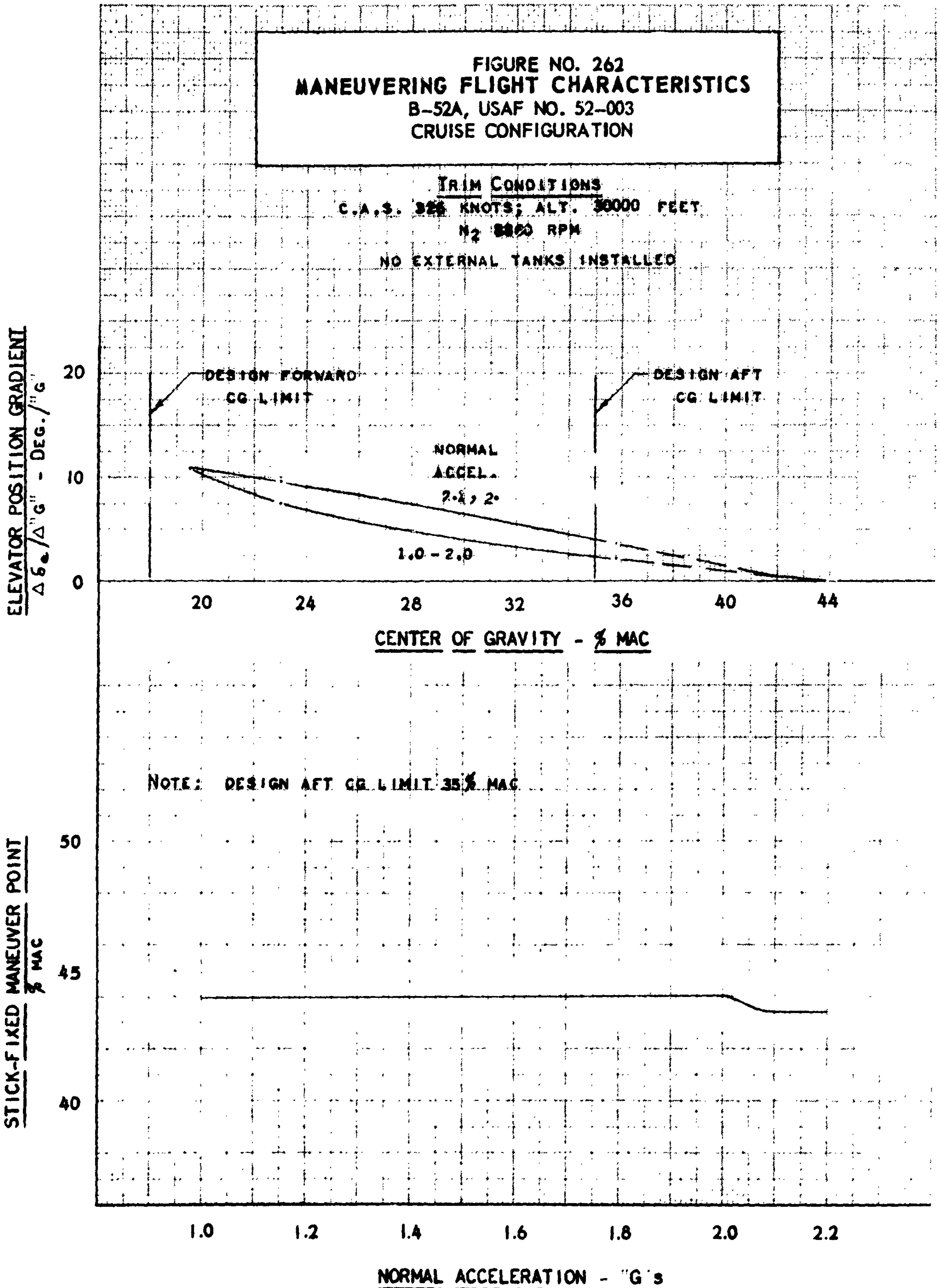


FIGURE NO. 263
MANEUVERING FLIGHT CHARACTERISTICS
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION

TRIM CONDITIONS
C.A.S. 328 KNOTS; ALT. 30000 FEET
N_2 8860 RPM

SYM.	AVG. C.G. % MAC	AVG. WT. POUNDS	STAB. POS. DEGREES
⊙	19.5	247,500	0.2 NOSE DN
△	23.0	244,000	1.6 NOSE DN
⊡	35.8	250,500	2.5 NOSE DN

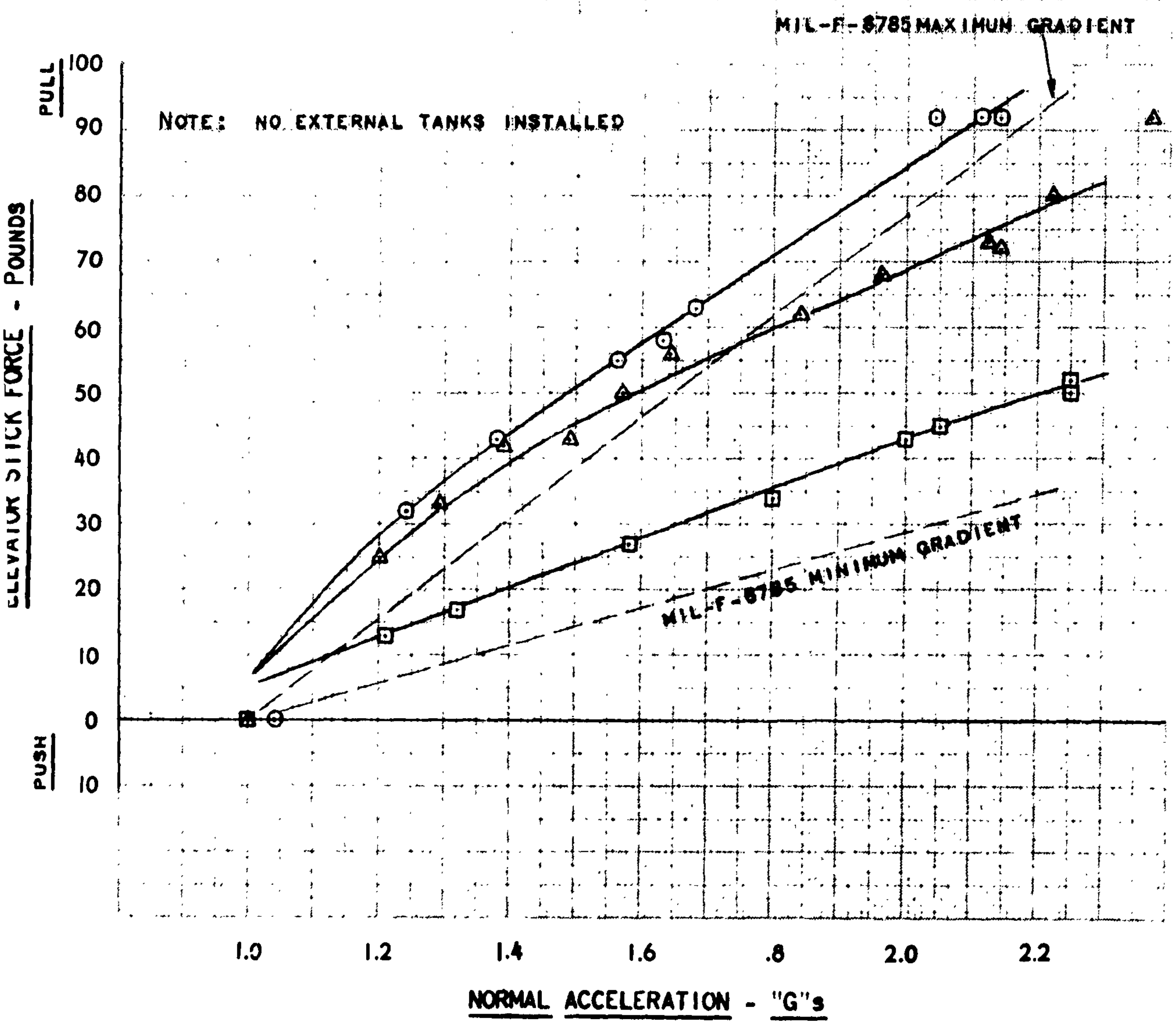


FIGURE NO. 264
MANEUVERING FLIGHT CHARACTERISTICS
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION

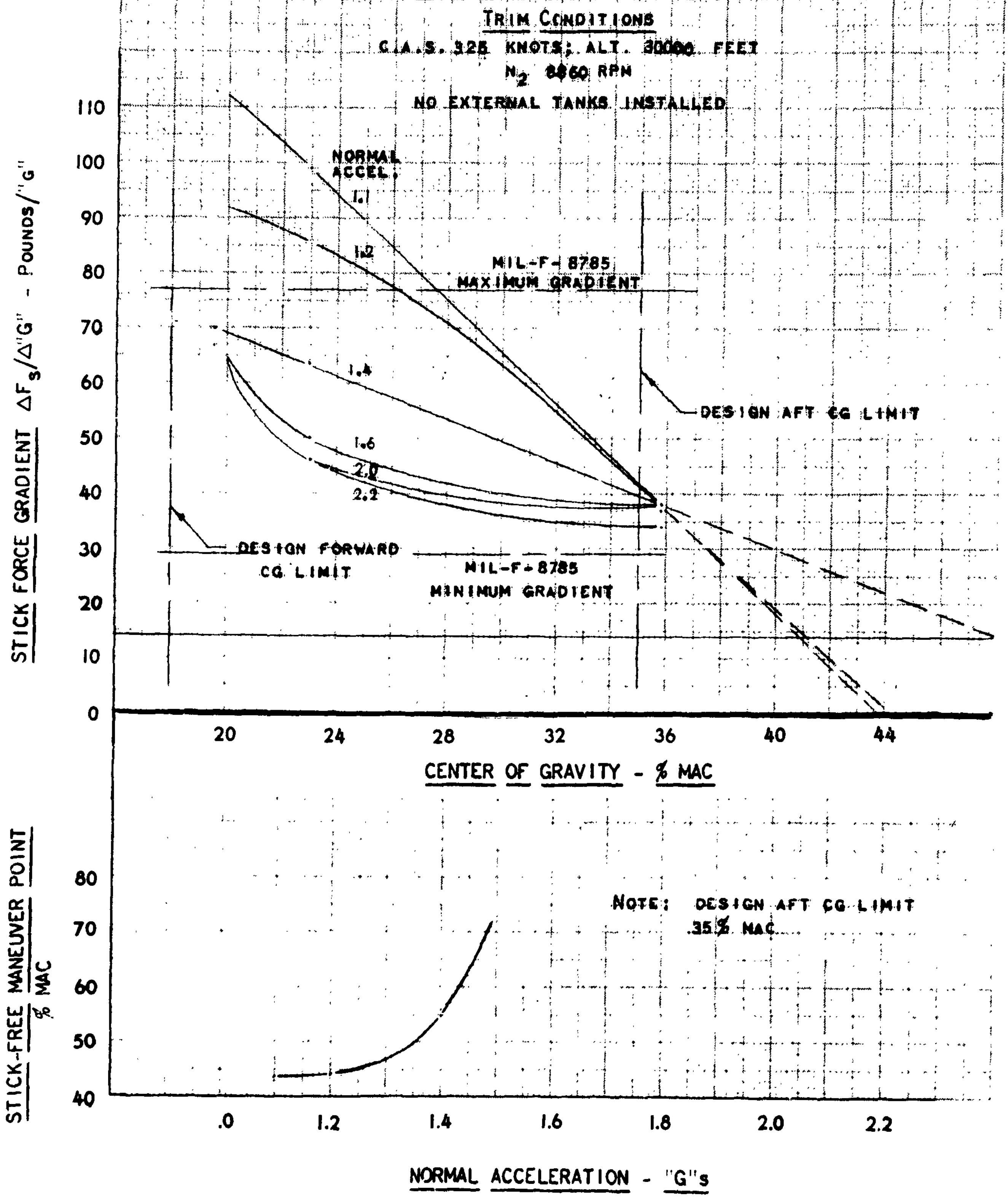


FIGURE NO. 265

MANEUVERING FLIGHT CHARACTERISTICS

B-52A, USAF NO. 52-003

POWER CONFIGURATION

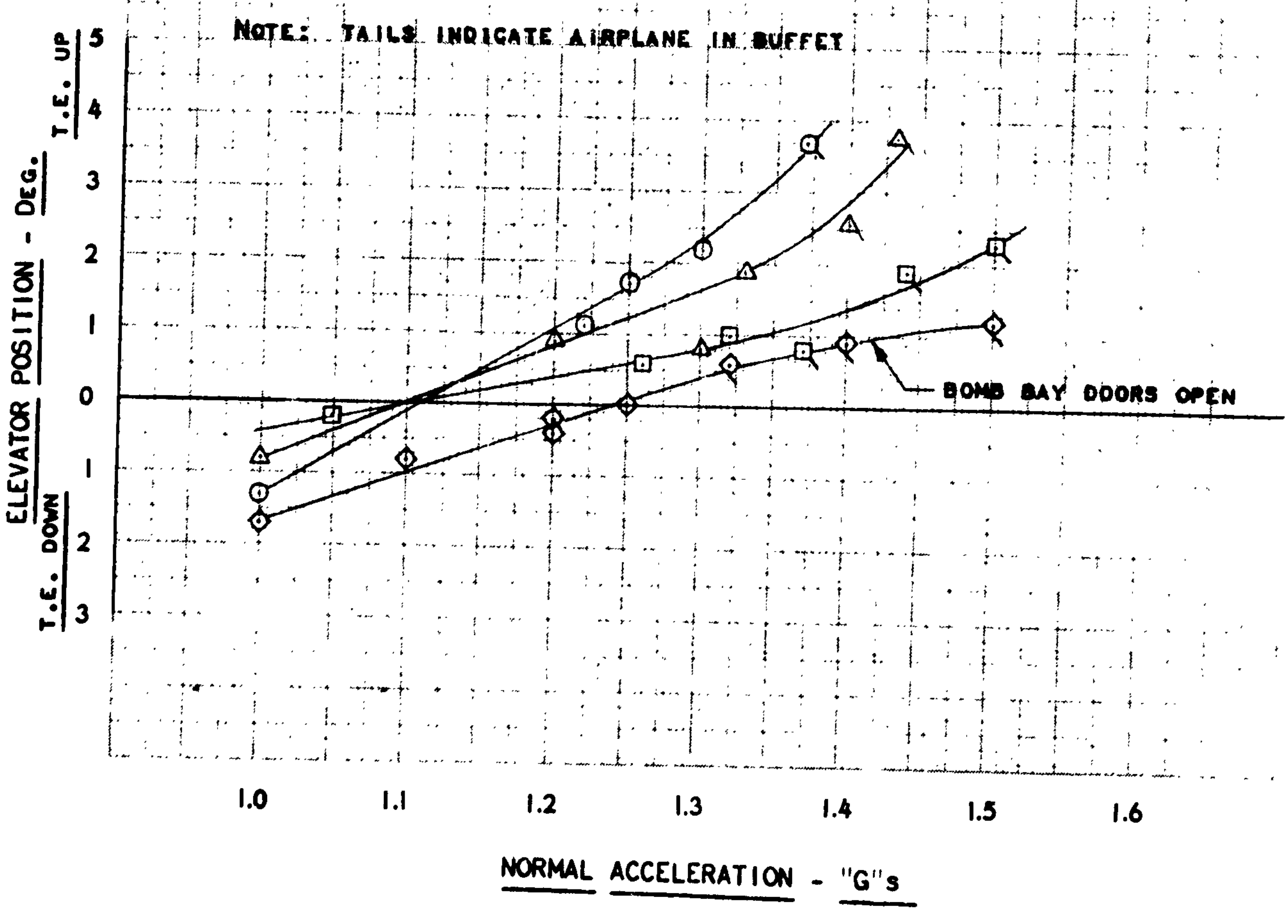
TRIM CONDITIONS

C.A.S. 204 KNOTS; ALT. 48,000 FEET

N_2 6940 RPM

NO EXTERNAL TANKS INSTALLED

SYM.	AVG. C.G. % MAC	AVG. WT. POUNDS	STAB. POS. DEGREES
○	17.4	259,000	1.6 NOSE UP
△	28.2	260,000	0.1 NOSE DN
□	34.3	259,000	1.1 NOSE DN
◇	34.2	253,000	1.2 NOSE DN, BOMB BAY DOORS OPEN



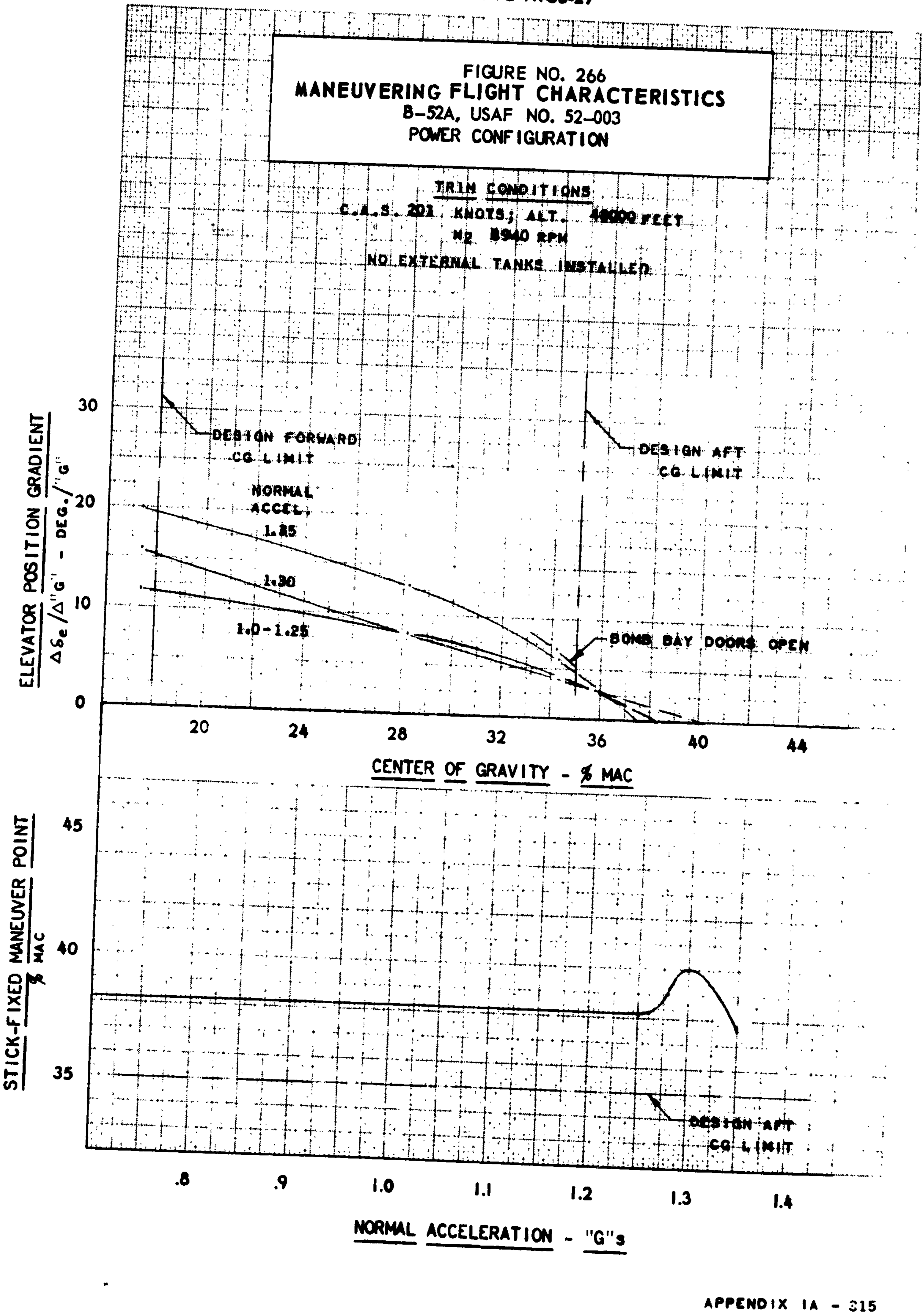


FIGURE NO. 266
MANEUVERING FLIGHT CHARACTERISTICS
B-52A, USAF NO. 52-003
POWER CONFIGURATION
TRIM CONDITIONS
C.A.S. 201 KNOTS; ALT. 40000 FEET
N2 8940 RPM
NO EXTERNAL TANKS INSTALLED
DESIGN FORWARD CG LIMIT
DESIGN AFT CG LIMIT
NORMAL ACCEL. 1.35
1.30
1.0-1.25
BOMB BAY DOORS OPEN
ELEVATOR POSITION GRADIENT
Δδe/Δ"G" - DEG./"G"
30
20
10
0
20
24
28
32
36
40
44
CENTER OF GRAVITY - % MAC
STICK-FIXED MANEUVER POINT
% MAC
45
40
35
DESIGN AFT CG LIMIT
.8
.9
1.0
1.1
1.2
1.3
1.4
NORMAL ACCELERATION - "G"s

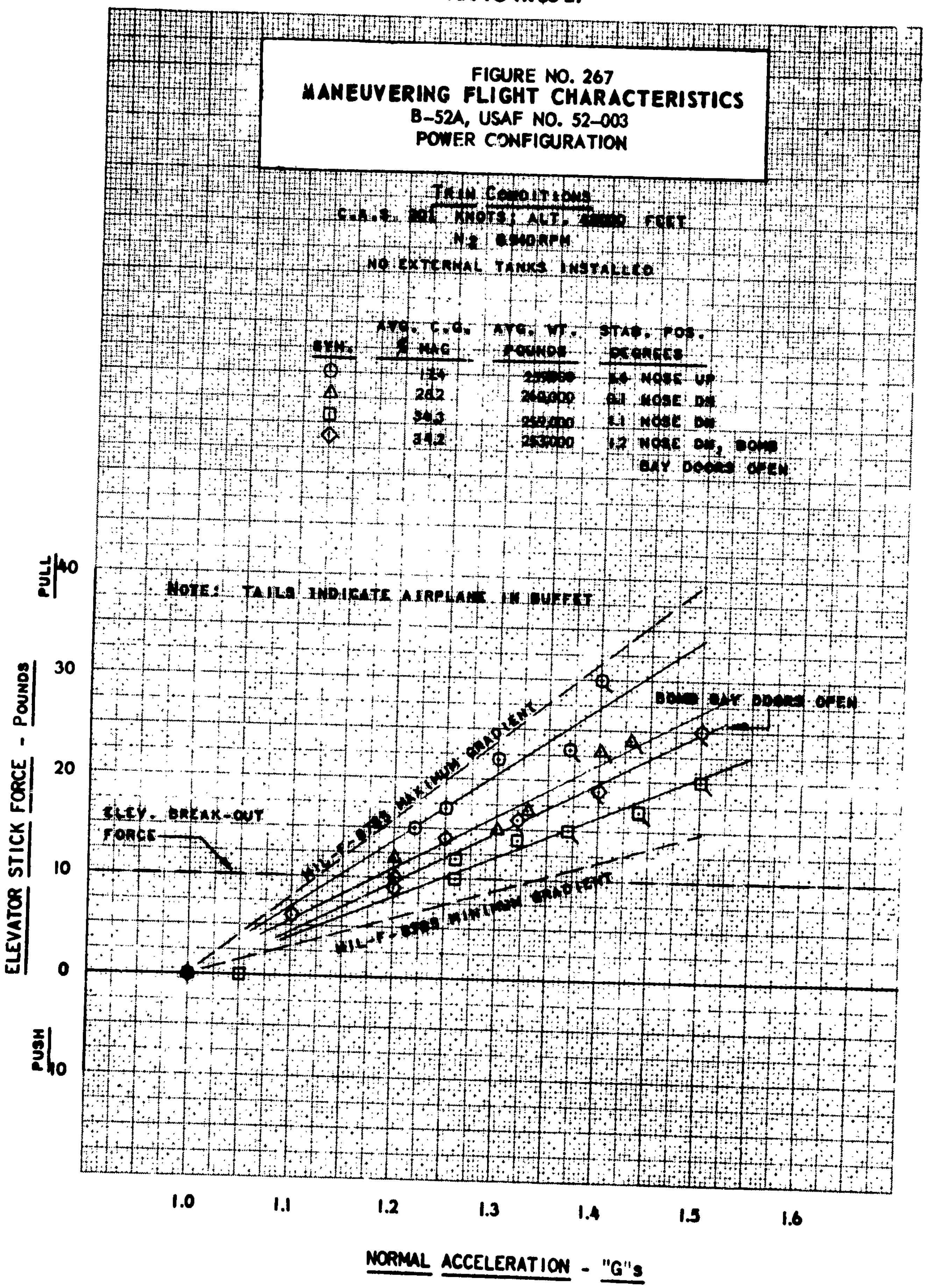


FIGURE NO. 267
MANEUVERING FLIGHT CHARACTERISTICS
B-52A, USAF NO. 52-003
POWER CONFIGURATION
TRIM CONDITIONS
KNOTS; ALT. FEET
NO EXTERNAL TANKS INSTALLED
SYM.
AVG. C.G. % MAC
AVG. WT. POUNDS
STAB. POS. DEGREES
34.3
34.2
253000
NOSE UP
NOSE DN
NOSE DN
NOSE DN, BOMB BAY DOORS OPEN
NOTE: TAILS INDICATE AIRPLANE IN BUFFET
MIL-F-8785 MAXIMUM GRADIENT
MIL-F-8785 MINIMUM GRADIENT
BOMB BAY DOORS OPEN
ELEV. BREAK-OUT FORCE
ELEVATOR STICK FORCE - POUNDS
PULL
PUSH
40
30
20
10
0
10
1.0
1.1
1.2
1.3
1.4
1.5
1.6
NORMAL ACCELERATION - "G"s

FIGURE NO. 268
MANEUVERING FLIGHT CHARACTERISTICS
B-52A, USAF NO. 52-003
POWER CONFIGURATION

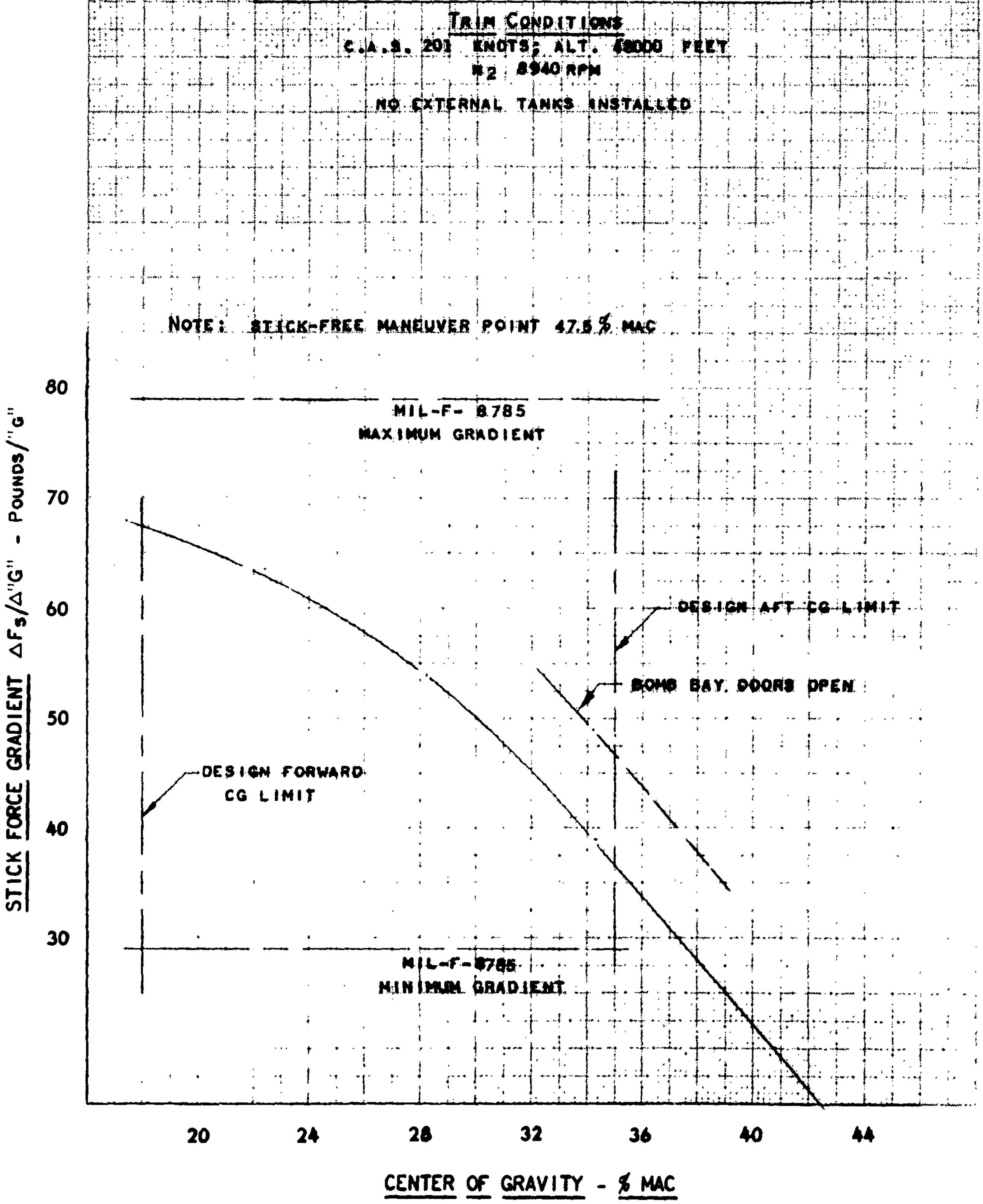


FIGURE NO. 269
MANEUVERING FLIGHT CHARACTERISTICS
B-52A, USAF NO. 52-003
POWER CONFIGURATION

TRIM CONDITIONS
C.A.S. 202 KNOTS; ALT. 48000 FEET
N_2 9030 RPM; EXT. TANKS INSTALLED

SYM.	AVG. C.G. % MAC	AVG. WT. POUNDS	STAB. POS. DEGREES
⊙	18.3	252000	1.0 NOSE UP
△	33.8	263500	1.5 NOSE DN

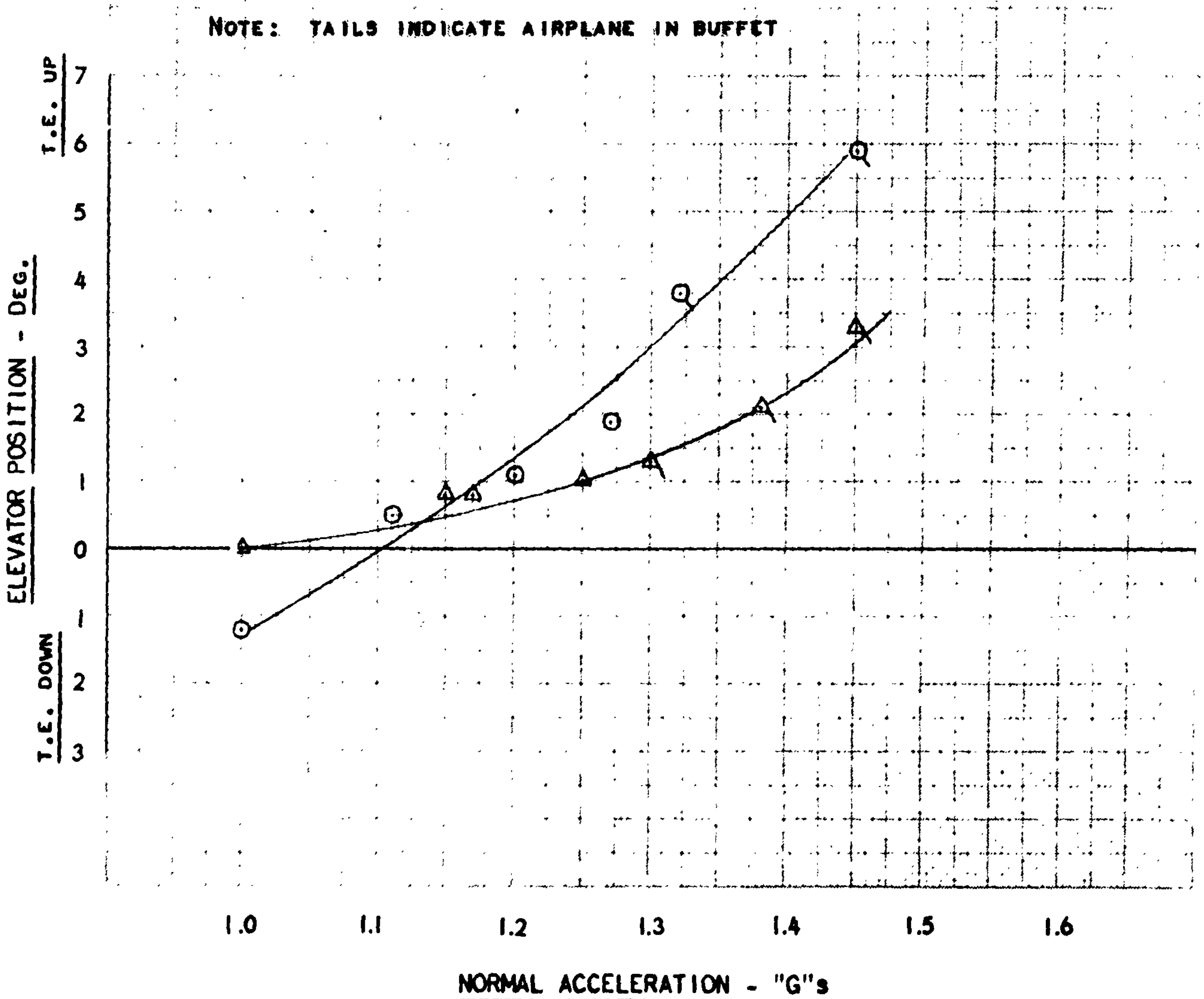
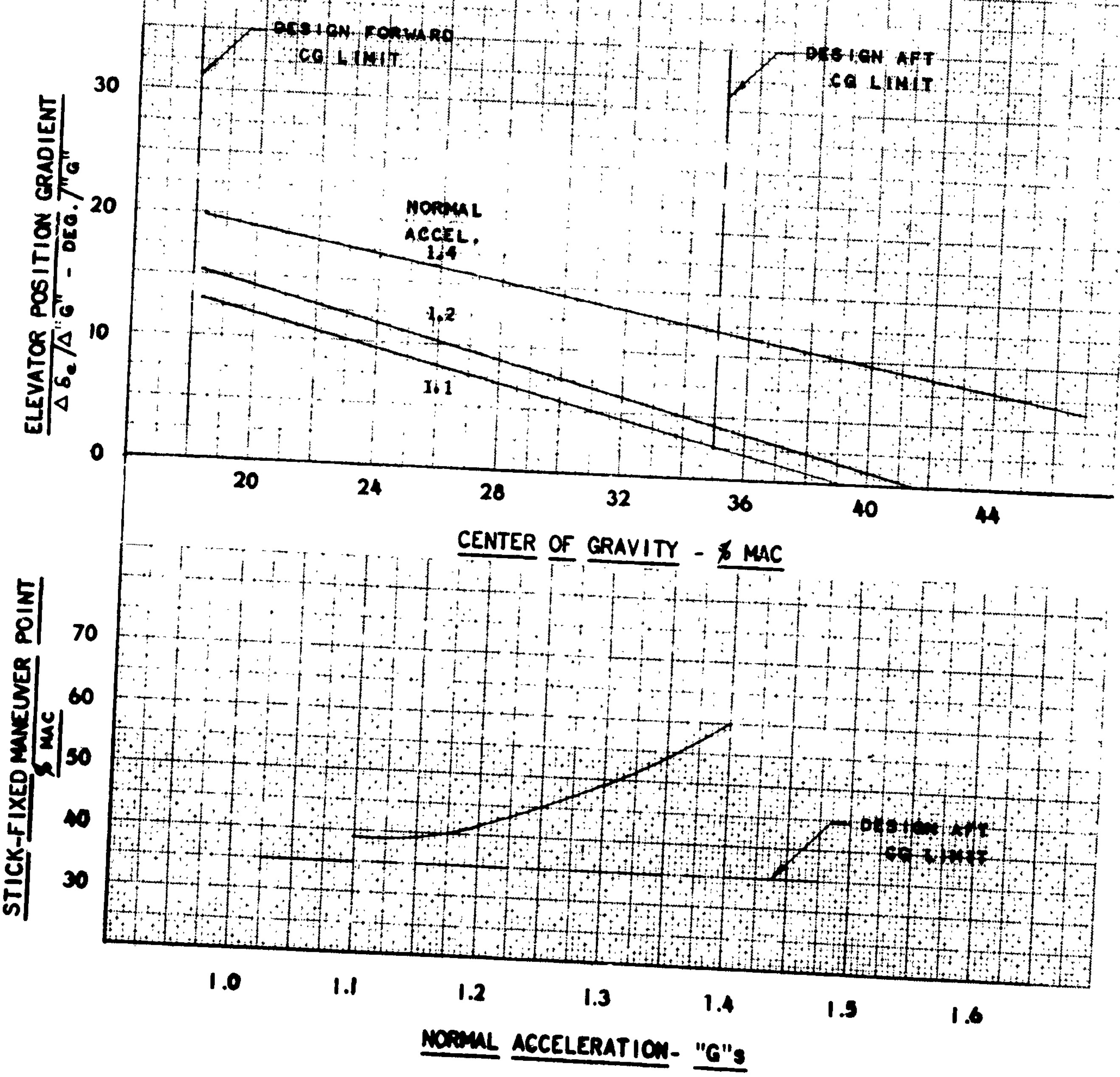


FIGURE NO. 270
MANEUVERING FLIGHT CHARACTERISTICS
B-52A, USAF NO. 52-003
POWER CONFIGURATION

TRIM CONDITIONS
C.A.S.=[redacted] KNOTS; ALT. [redacted] FEET
N2 [redacted] RPM; EXT. TANKS INSTALLED



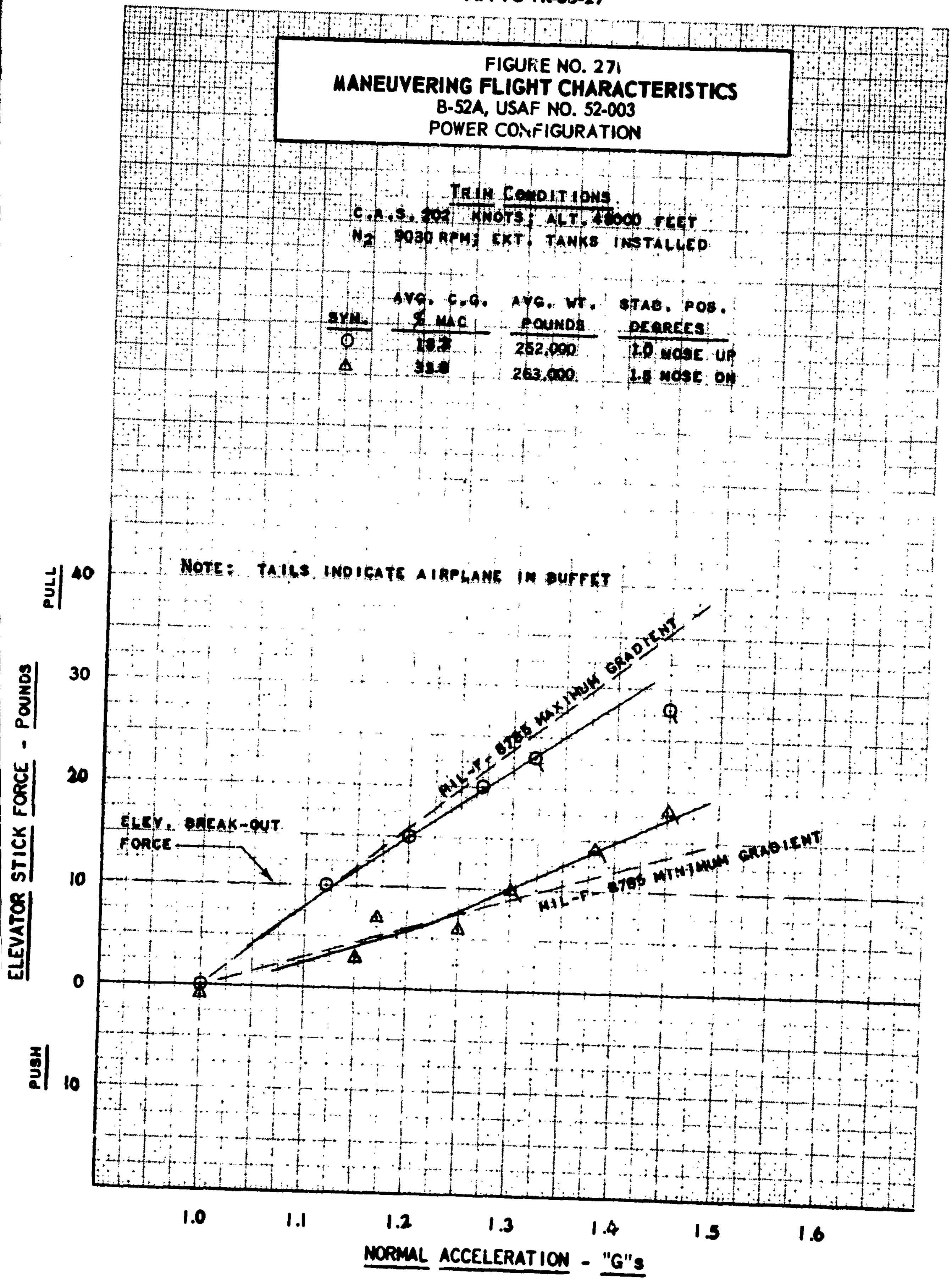
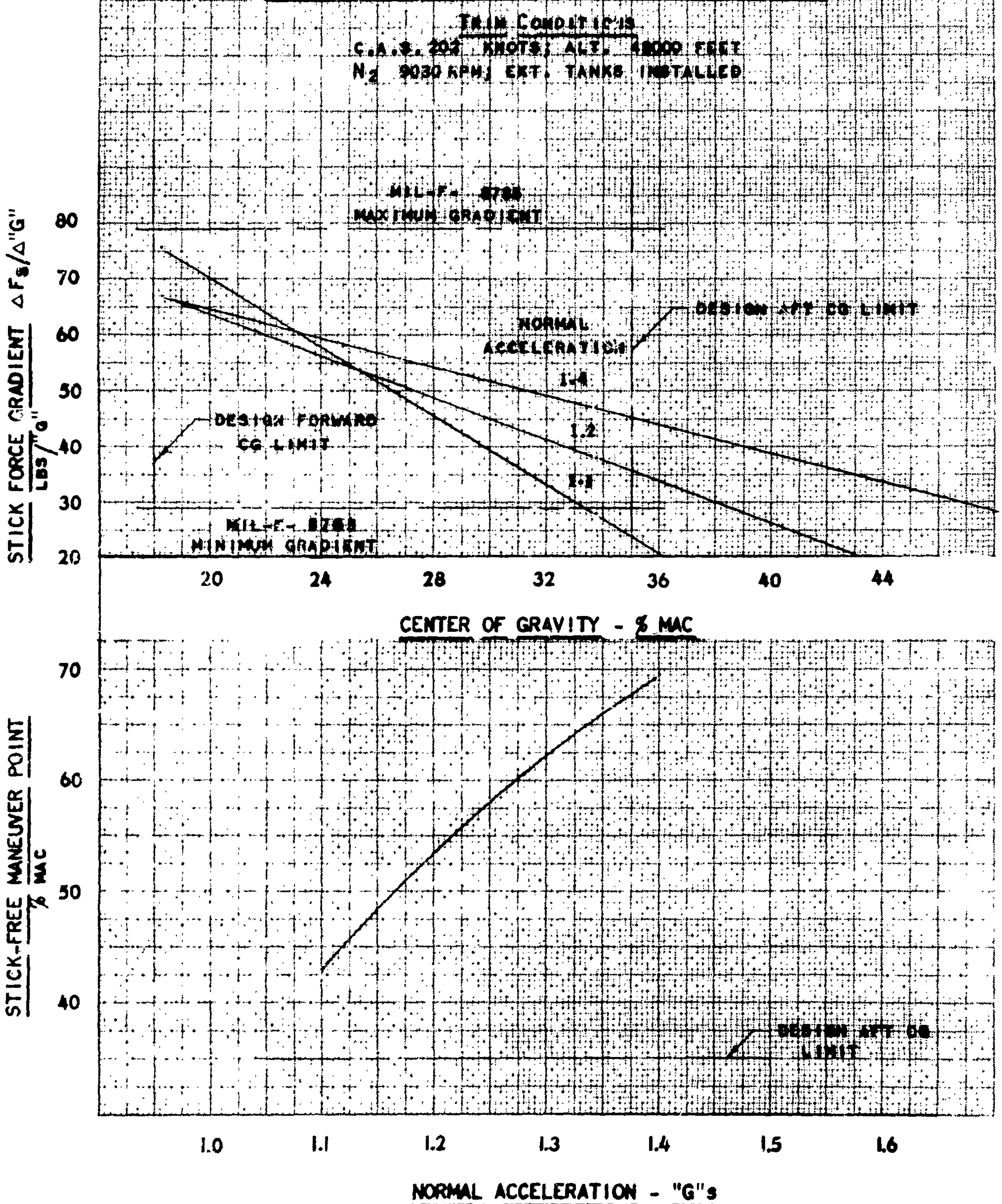


FIGURE NO. 271
MANEUVERING FLIGHT CHARACTERISTICS
B-52A, USAF NO. 52-003
POWER CONFIGURATION
TRIM CONDITIONS
C.A.S. KNOTS; ALT. FEET
N_2 9030 RPM; EXT. TANKS INSTALLED
SYM.
AVG. C.G. % MAC
AVG. WT. POUNDS
STAB. POS. DEGREES
252,000
263,000
1.0 NOSE UP
NOSE DN
NOTE: TAILS INDICATE AIRPLANE IN BUFFET
MIL-F-8785 MAXIMUM GRADIENT
MIL-F-8785 MINIMUM GRADIENT
ELEV. BREAK-OUT FORCE
PULL
PUSH
ELEVATOR STICK FORCE - POUNDS
40
30
20
10
0
10
1.0
1.1
1.2
1.3
1.4
1.5
1.6
NORMAL ACCELERATION - "G"s

FIGURE NO. 272
MANEUVERING FLIGHT CHARACTERISTICS
B-52A, USAF NO. 52-003
POWER CONFIGURATION



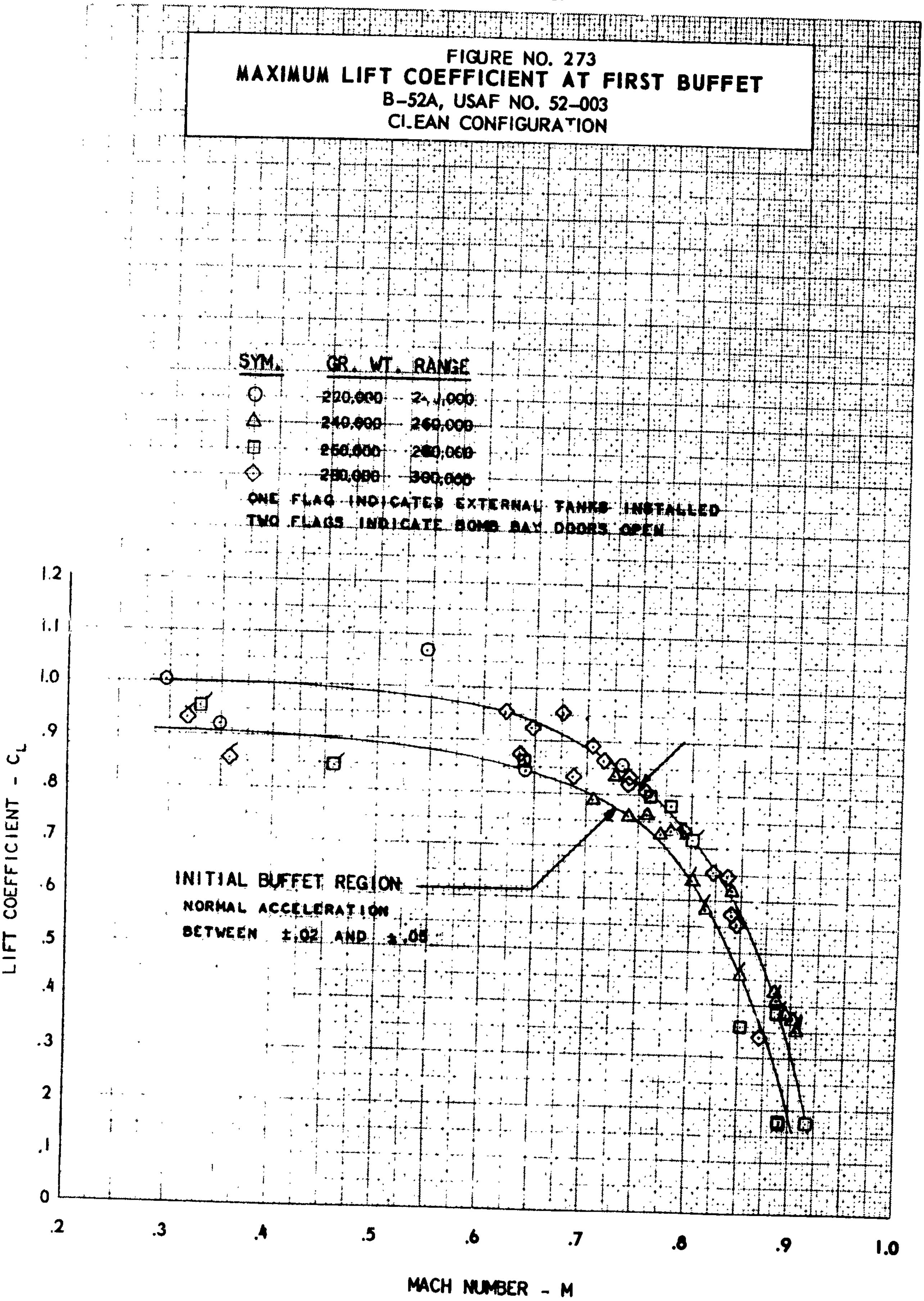
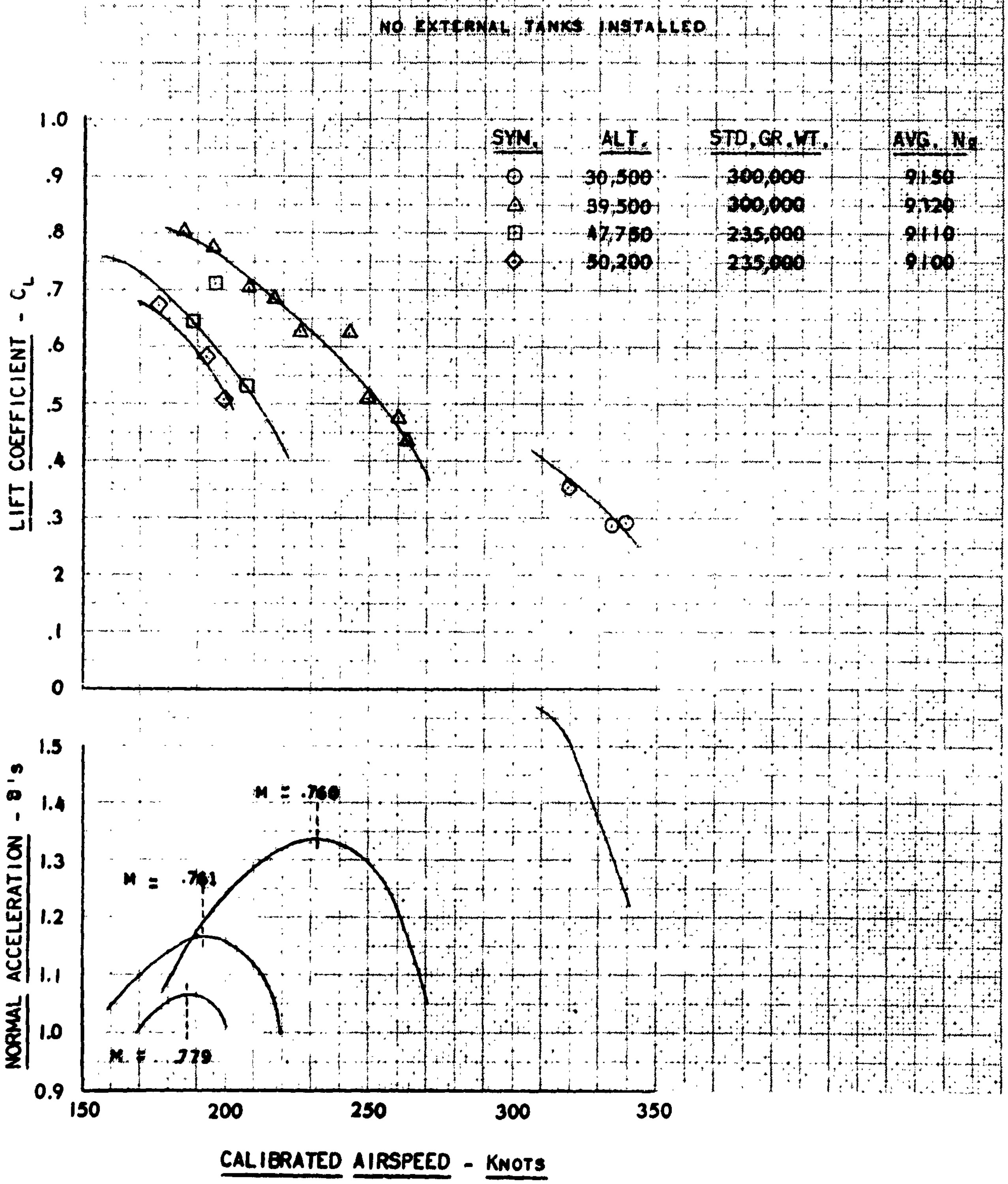


FIGURE NO. 273
MAXIMUM LIFT COEFFICIENT AT FIRST BUFFET
B-52A, USAF NO. 52-003
CLEAN CONFIGURATION
SYM.
GR. WT. RANGE
220,000 240,000
240,000 260,000
260,000 280,000
280,000 300,000
ONE FLAG INDICATES EXTERNAL TANKS INSTALLED
TWO FLAGS INDICATE BOMB BAY DOORS OPEN
INITIAL BUFFET REGION
NORMAL ACCELERATION
BETWEEN ±.02 AND ±.05
LIFT COEFFICIENT - C_L
MACH NUMBER - M
1.2
1.1
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
.2
.3
.4
.5
.6
.7
.8
.9
1.0

FIGURE NO. 274
MAXIMUM LIFT COEFFICIENT & NORMAL ACCELERATION
AT FULL POWER & CONSTANT ALTITUDE
B-52A, USAF NO. 52 - 003
CRUISE CONFIGURATION



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PRESENTING PLOTS

STATIC LONGITUDINAL STABILITY

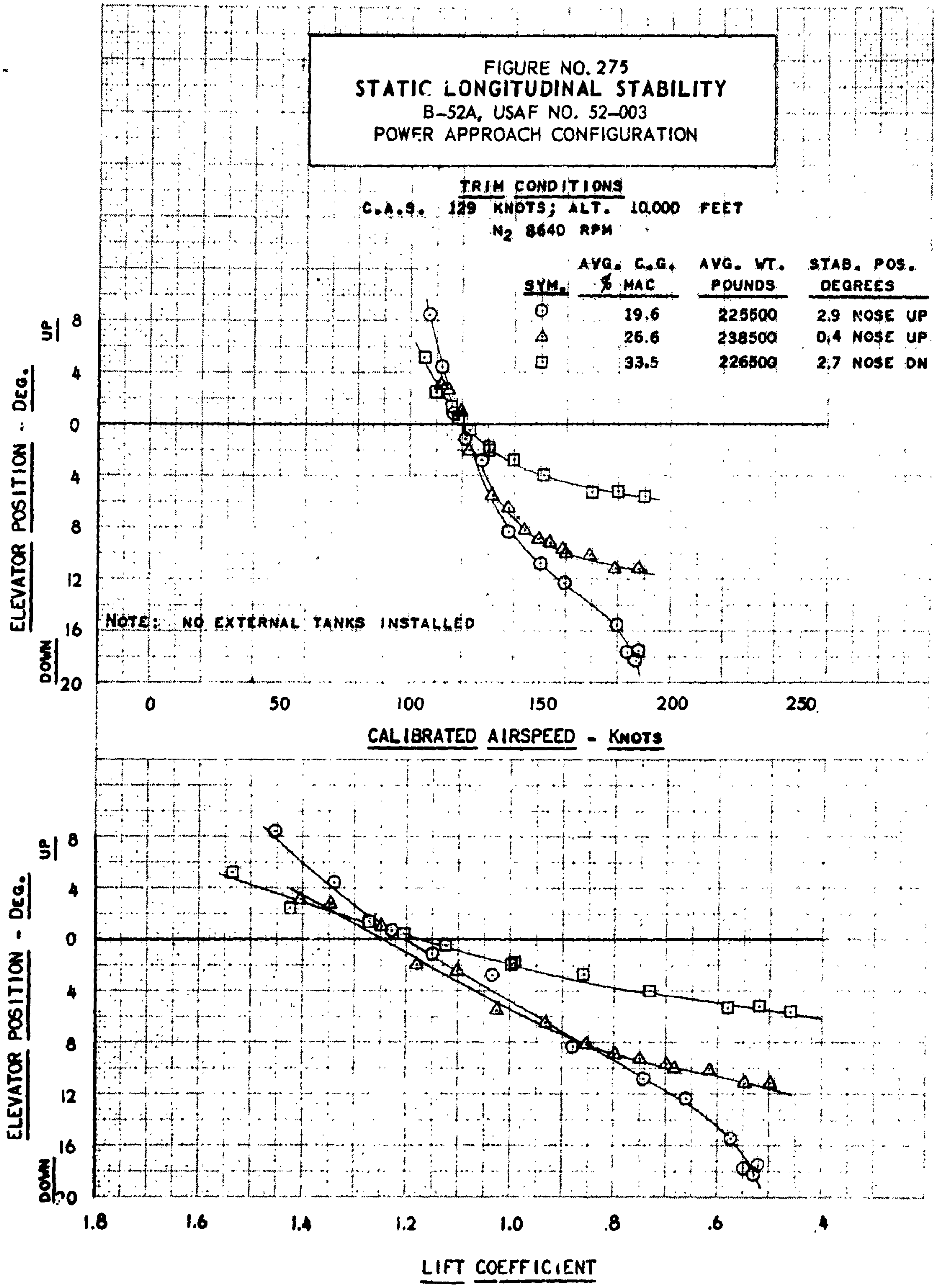
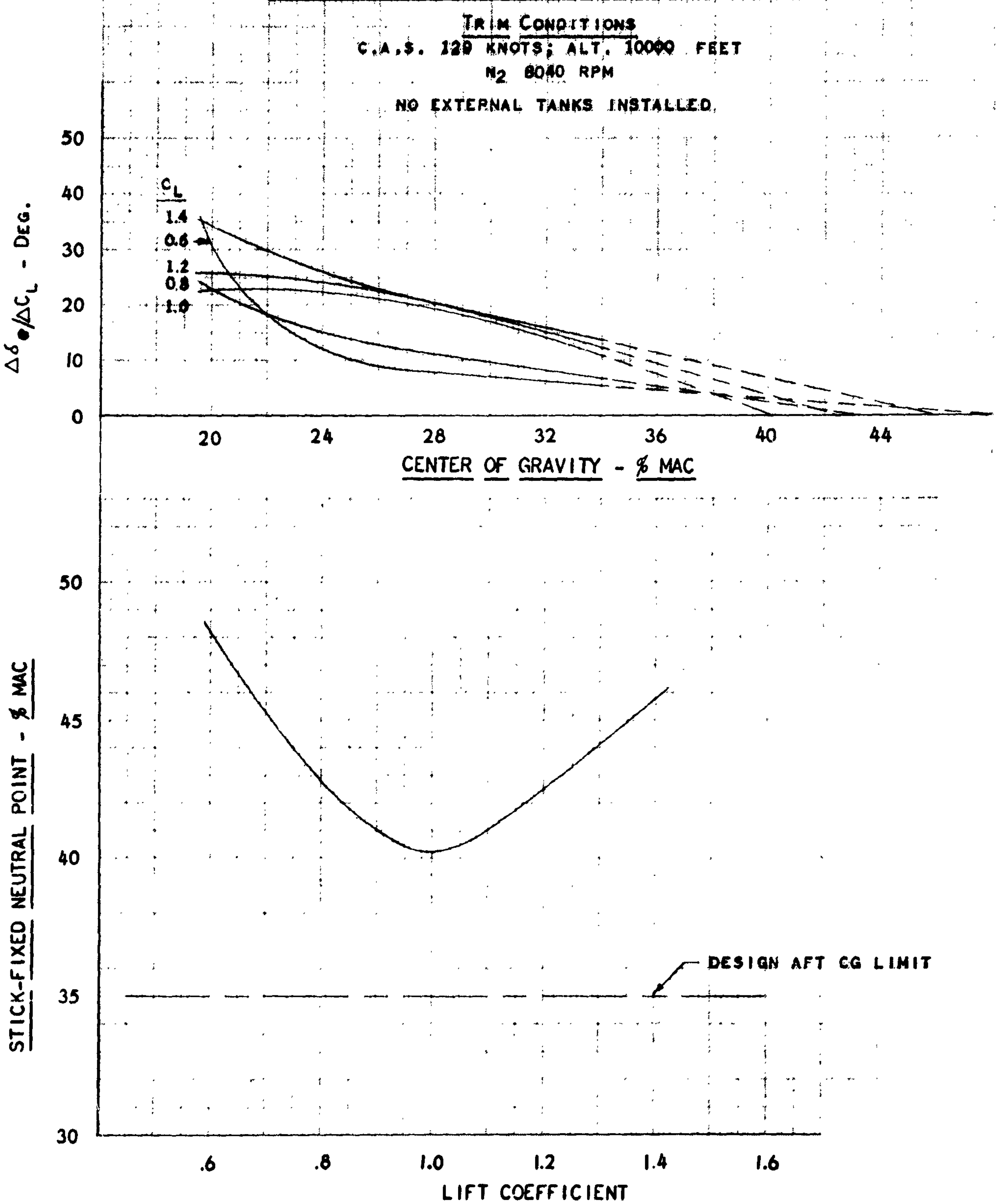


FIGURE NO. 275
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION
TRIM CONDITIONS
C.A.S. 129 KNOTS; ALT. 10,000 FEET
N2 8640 RPM
SYM.
AVG. C.G. % MAC
AVG. WT. POUNDS
STAB. POS. DEGREES
19.6 225500 2.9 NOSE UP
26.6 238500 0.4 NOSE UP
33.5 226500 2.7 NOSE DN
NOTE: NO EXTERNAL TANKS INSTALLED
ELEVATOR POSITION - DEG.
UP
DOWN
CALIBRATED AIRSPEED - KNOTS
LIFT COEFFICIENT

FIGURE NO.276
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION



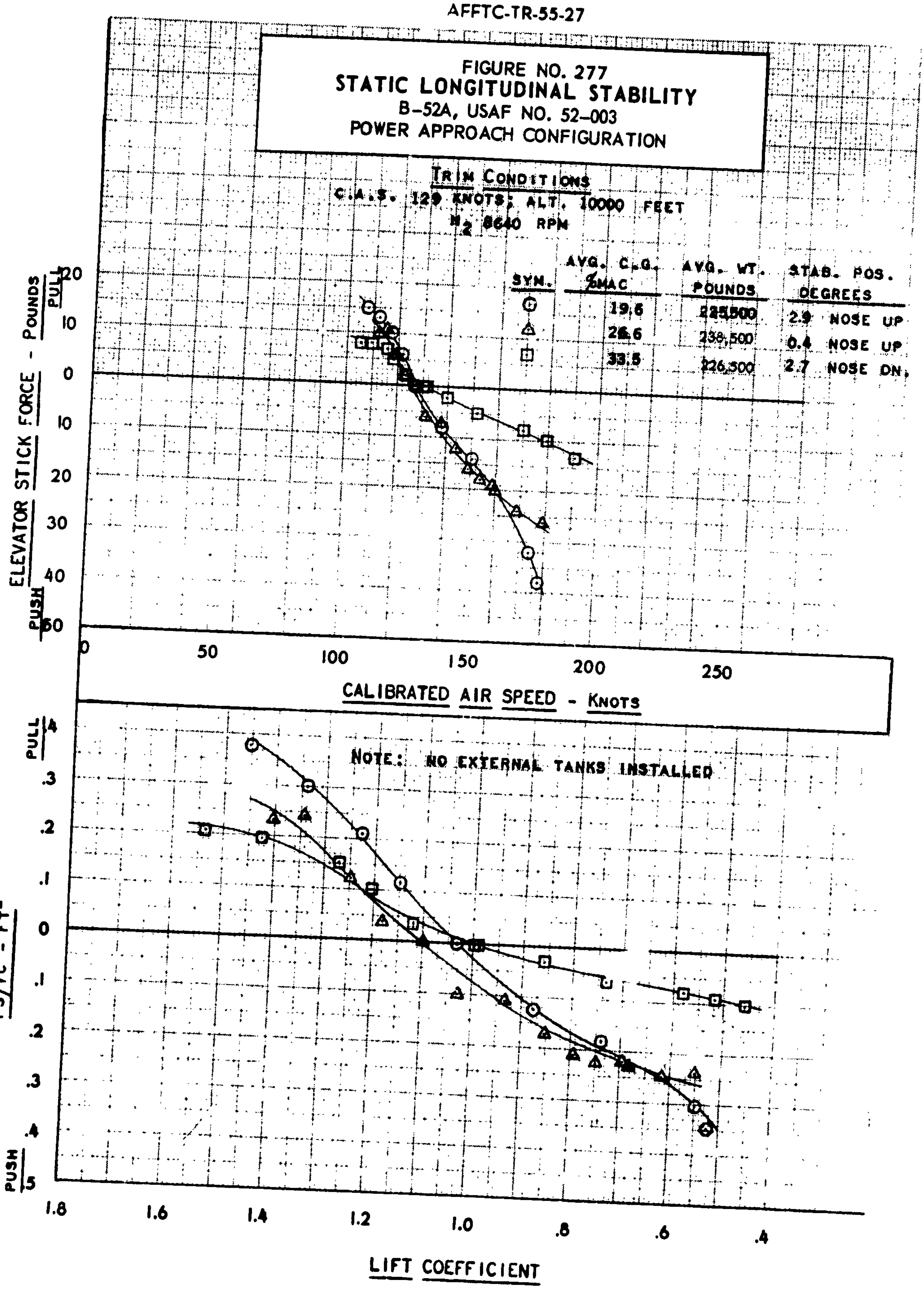
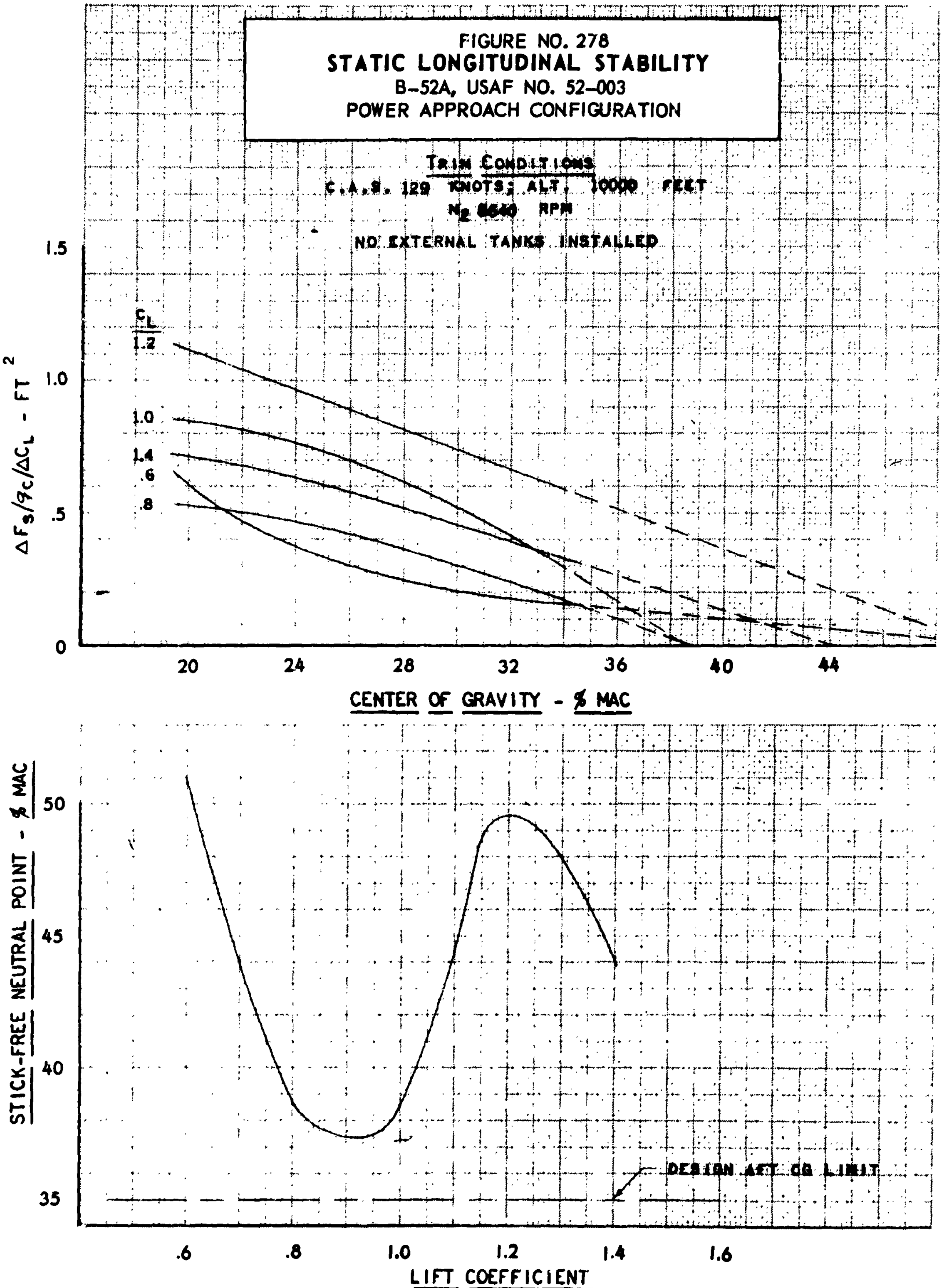


FIGURE NO. 277
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION

FIGURE NO. 278
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION



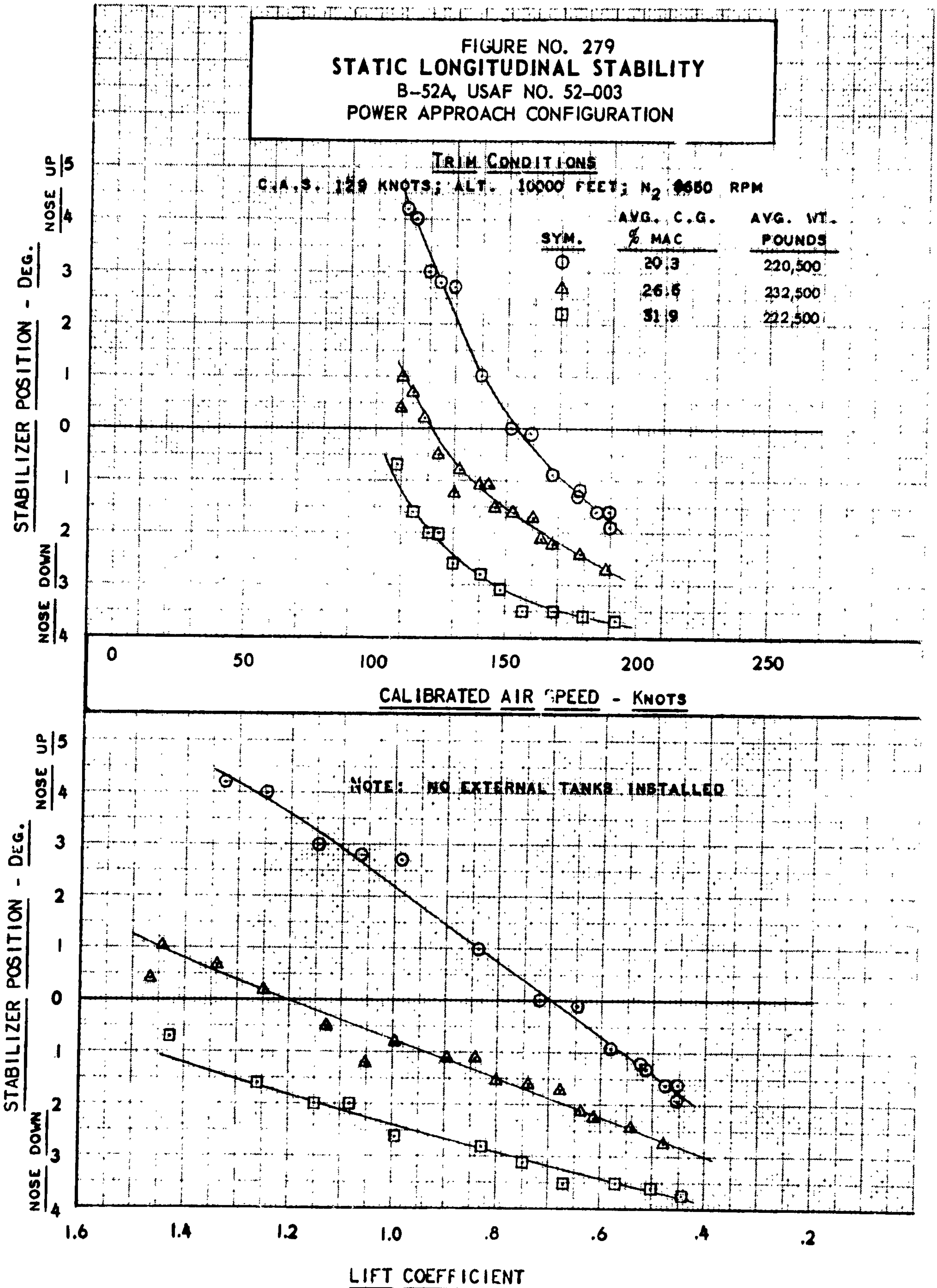


FIGURE NO. 279
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION
TRIM CONDITIONS
C.A.S. 129 KNOTS; ALT. 10000 FEET; N_2 9650 RPM
SYM.
AVG. C.G. % MAC
AVG. WT. POUNDS
20.3
220,500
26.6
232,500
31.9
222,500
STABILIZER POSITION - DEG.
NOSE UP
NOSE DOWN
CALIBRATED AIR SPEED - KNOTS
0
50
100
150
200
250
NOTE: NO EXTERNAL TANKS INSTALLED
LIFT COEFFICIENT
1.6
1.4
1.2
1.0
.8
.6
.4
.2

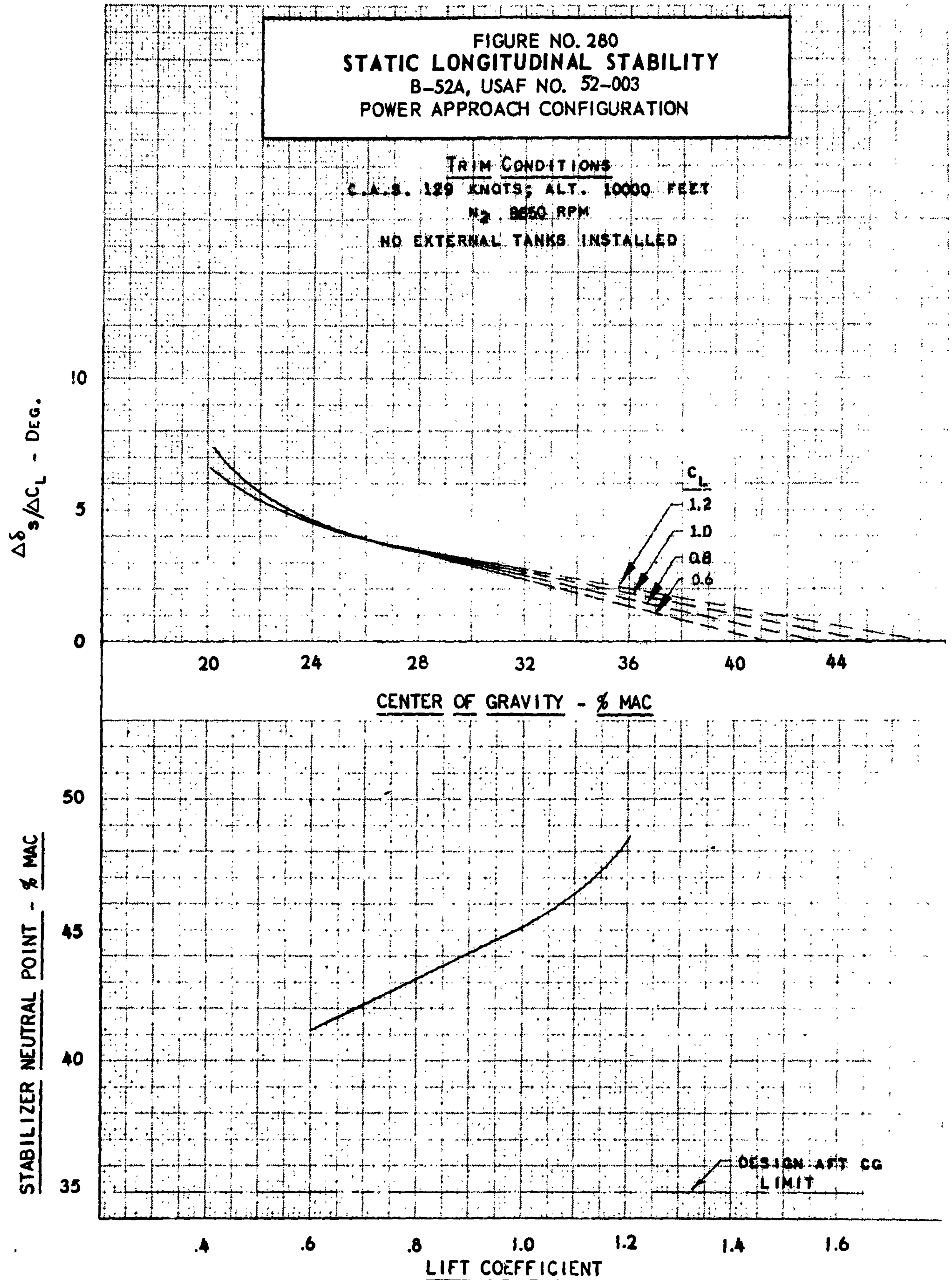


FIGURE NO. 280
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION
TRIM CONDITIONS
C.A.S. 129 KNOTS; ALT. 10000 FEET
N_2 . 8650 RPM
NO EXTERNAL TANKS INSTALLED
$\Delta\delta_s/\Delta C_L$ - DEG.
10
5
0
C_L
1.2
1.0
0.8
0.6
20
24
28
32
36
40
44
CENTER OF GRAVITY - % MAC
STABILIZER NEUTRAL POINT - % MAC
50
45
40
35
DESIGN AFT CG LIMIT
.4
.6
.8
1.0
1.2
1.4
1.6
LIFT COEFFICIENT

FIGURE NO.281
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION

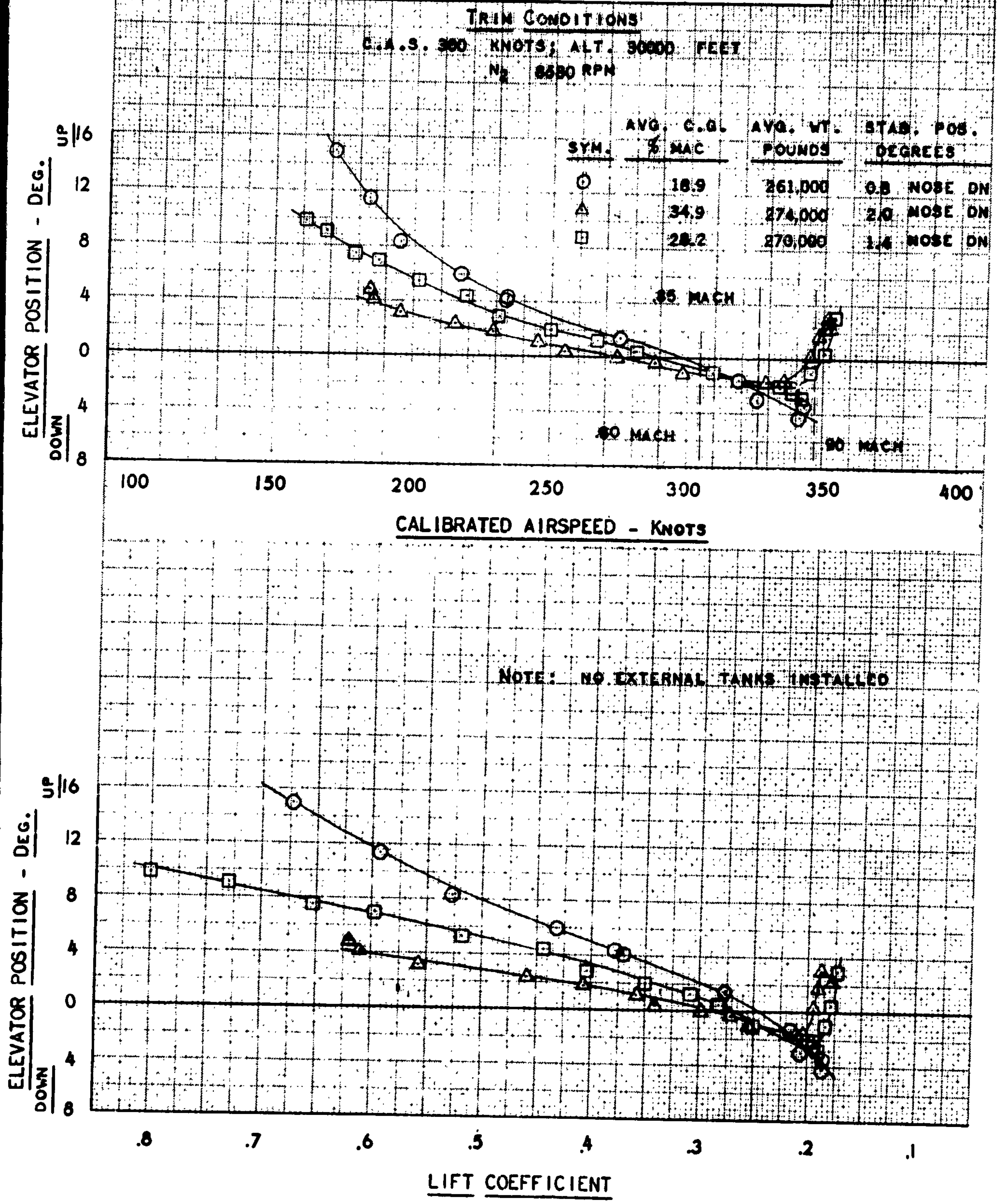
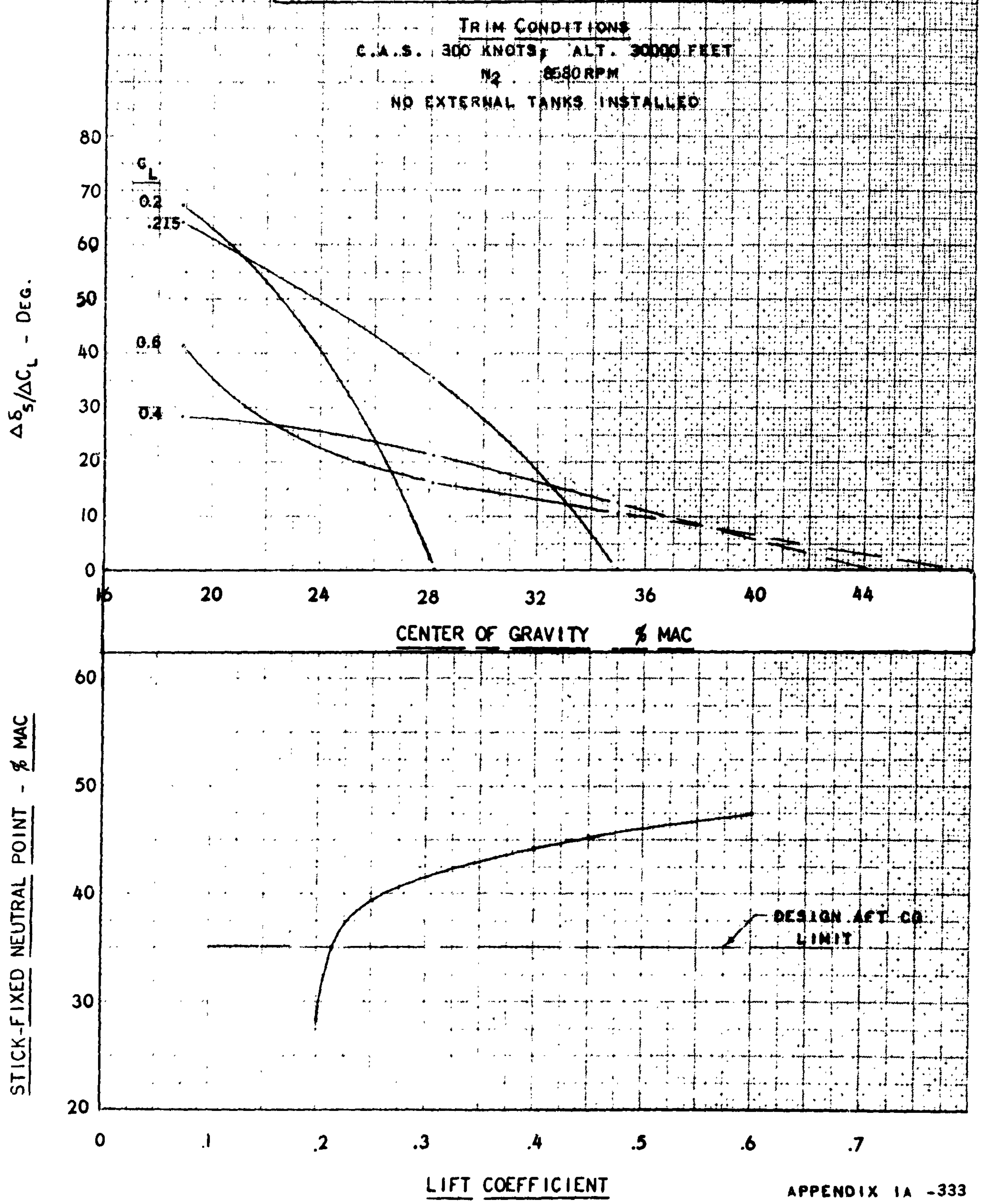


FIGURE NO. 282
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION



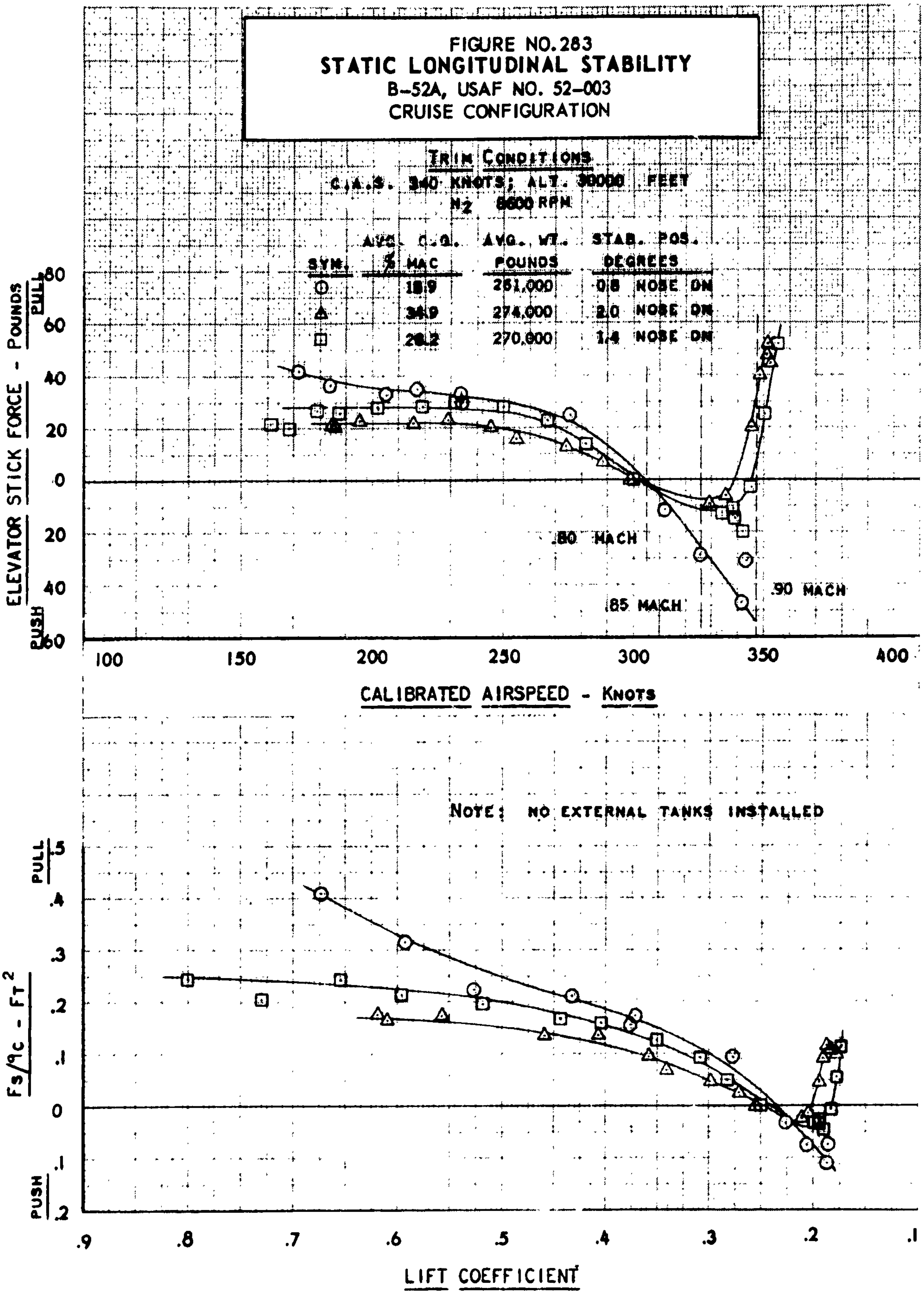


FIGURE NO. 283
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION
TRIM CONDITIONS
C.A.S. 340 KNOTS; ALT. 30000 FEET
N_2 8600 RPM
SYM.
AVG. C.G. % MAC
AVG. WT. POUNDS
STAB. POS. DEGREES
18.9
251,000
0.8 NOSE DN
34.9
274,000
2.0 NOSE DN
28.2
270,000
1.4 NOSE DN
ELEVATOR STICK FORCE - POUNDS
PULL
PUSH
80
60
40
20
0
20
40
60
.80 MACH
.85 MACH
.90 MACH
100
150
200
250
300
350
400
CALIBRATED AIRSPEED - KNOTS
NOTE: NO EXTERNAL TANKS INSTALLED
F_s/q_c - FT^2
.5
.4
.3
.2
.1
0
.1
.2
.9
.8
.7
.6
.5
.4
.3
.2
.1
LIFT COEFFICIENT

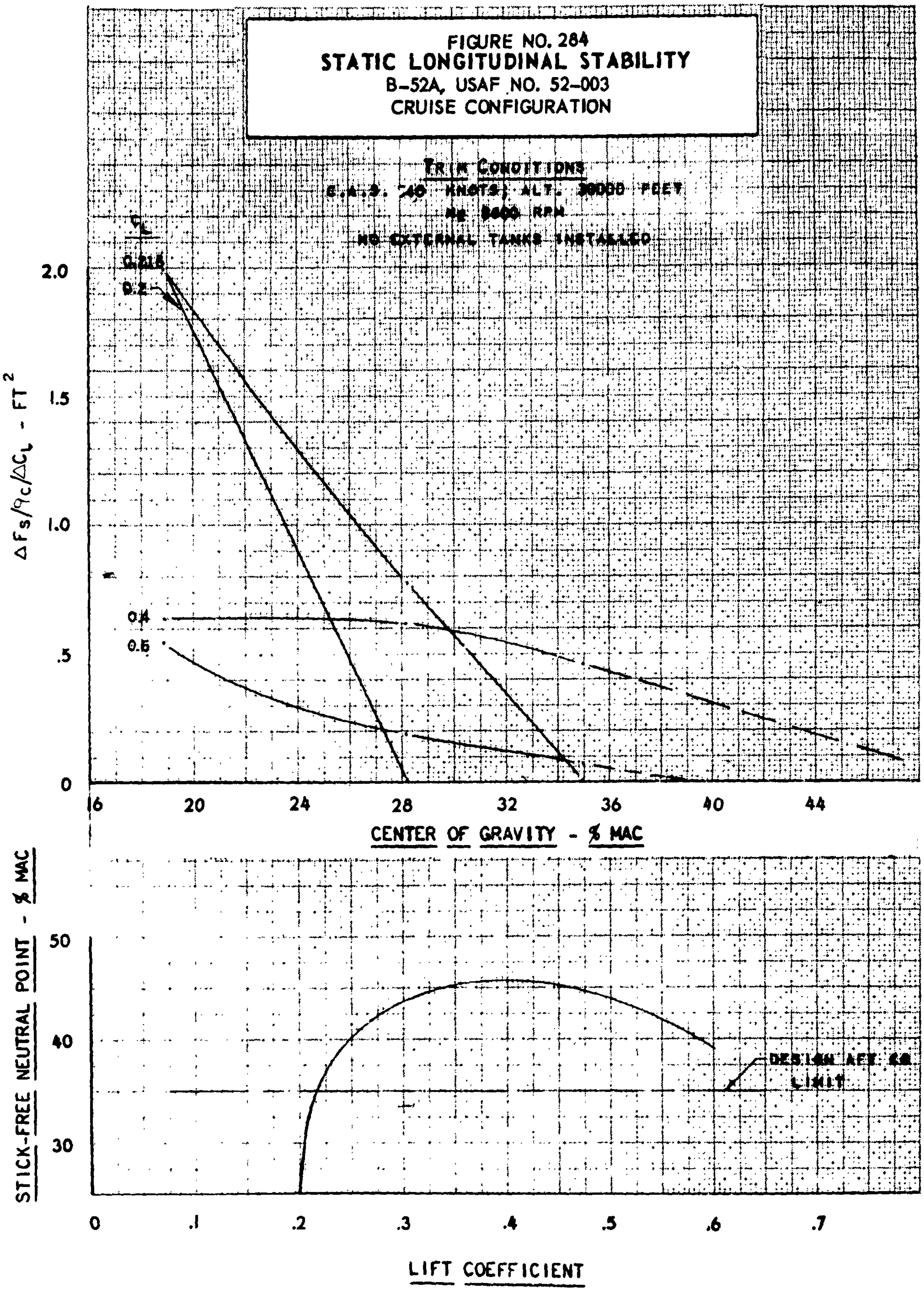
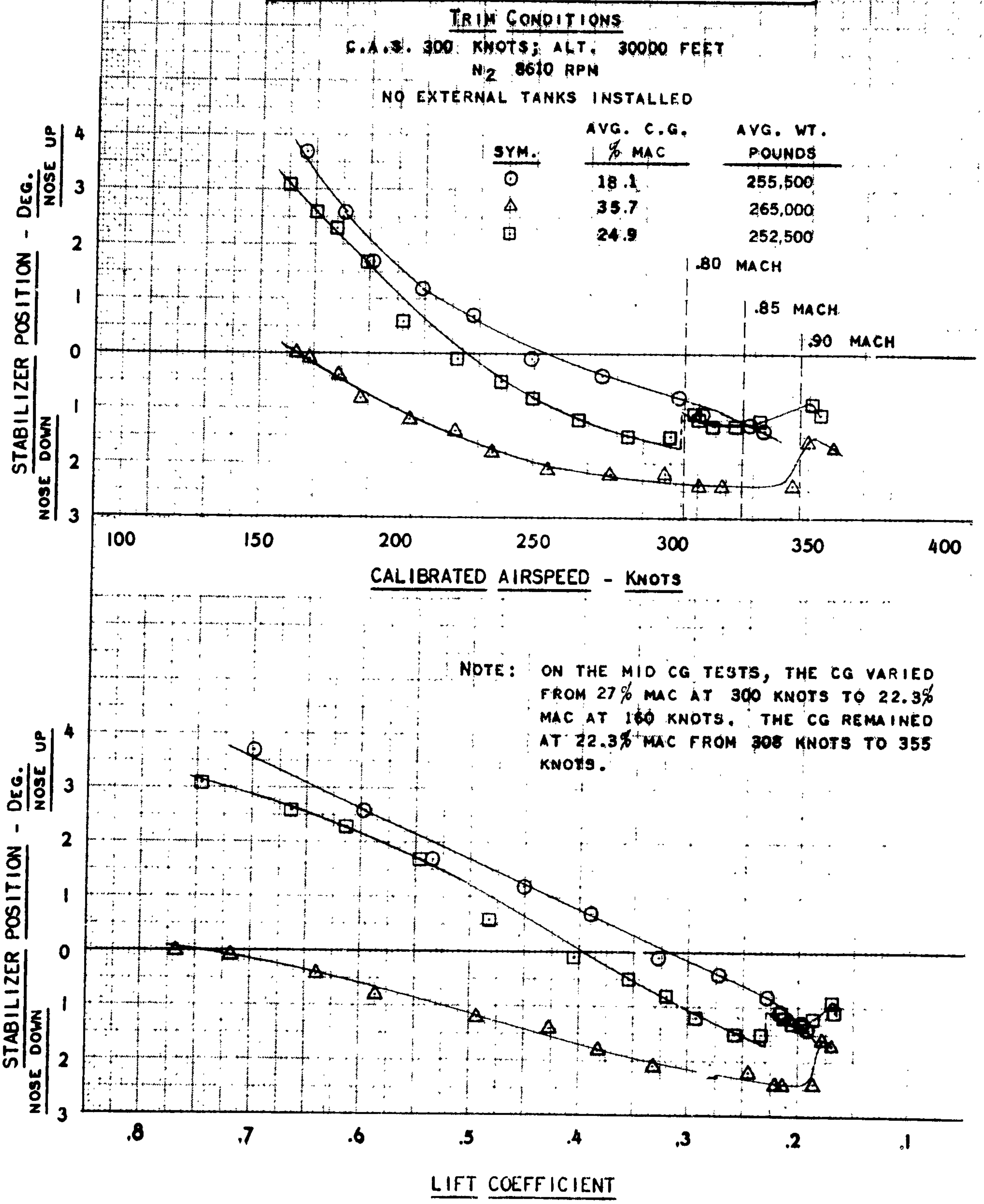


FIGURE NO. 284
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION
TRIM CONDITIONS
NO EXTERNAL TANKS INSTALLED
C_L
0.215
0.2
0.4
0.5
$\Delta F_s/q_c/\Delta C_L$ - FT^2
2.0
1.5
1.0
.5
0
16
20
24
28
32
36
40
44
CENTER OF GRAVITY - % MAC
STICK-FREE NEUTRAL POINT - % MAC
50
40
30
DESIGN AFT CG LIMIT
0
.1
.2
.3
.4
.5
.6
.7
LIFT COEFFICIENT

FIGURE NO. 285
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION



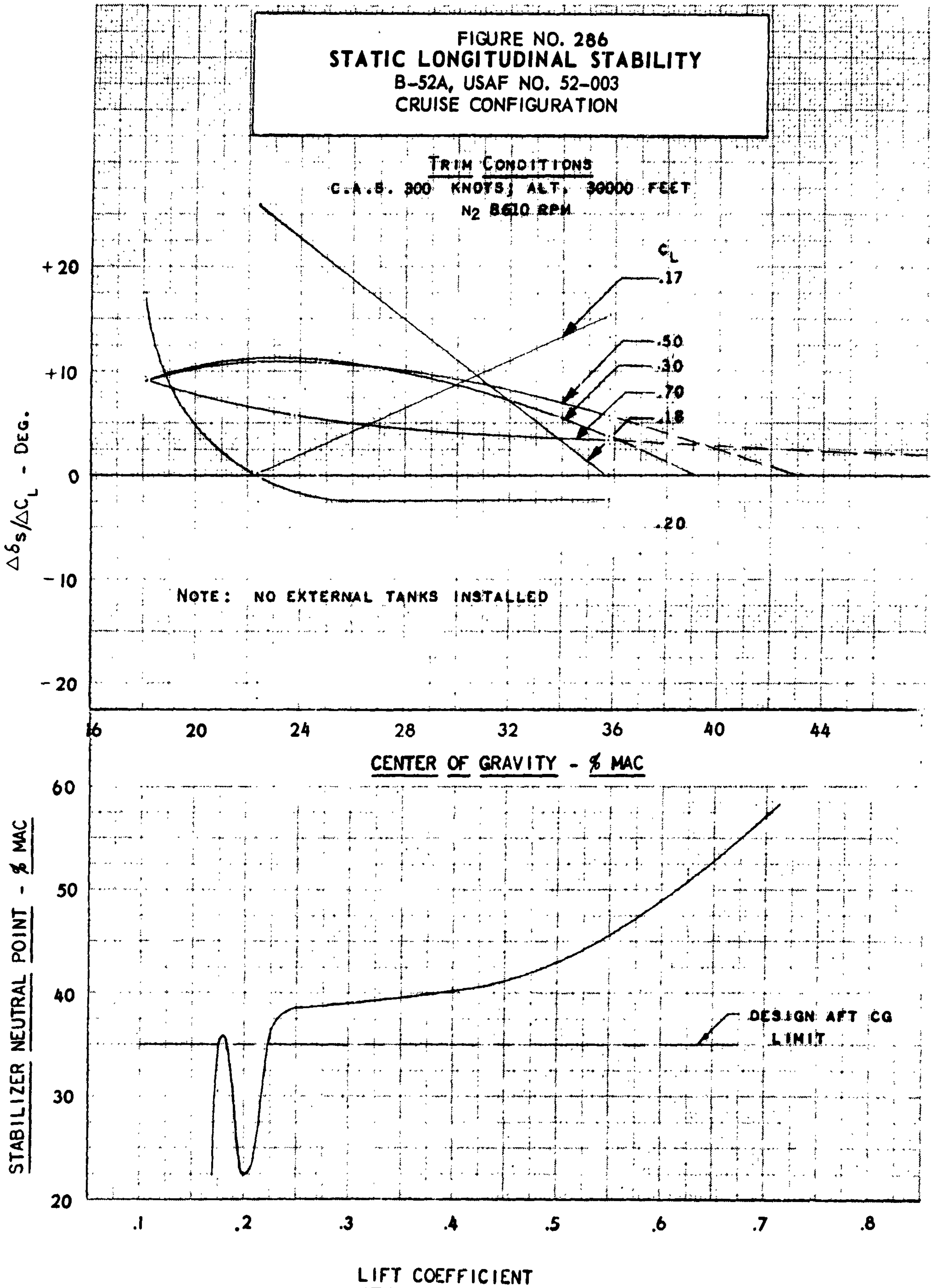


FIGURE NO. 286
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION
TRIM CONDITIONS
C.A.S. 300 KNOTS; ALT. 30000 FEET
N2 8610 RPM
CL
.17
.50
.30
.70
.18
.20
NOTE: NO EXTERNAL TANKS INSTALLED
+20
+10
0
-10
-20
ΔδS/ΔCL - DEG.
16
20
24
28
32
36
40
44
CENTER OF GRAVITY - % MAC
60
50
40
30
20
STABILIZER NEUTRAL POINT - % MAC
DESIGN AFT CG LIMIT
.1
.2
.3
.4
.5
.6
.7
.8
LIFT COEFFICIENT

FIGURE NO. 287
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER CONFIGURATION

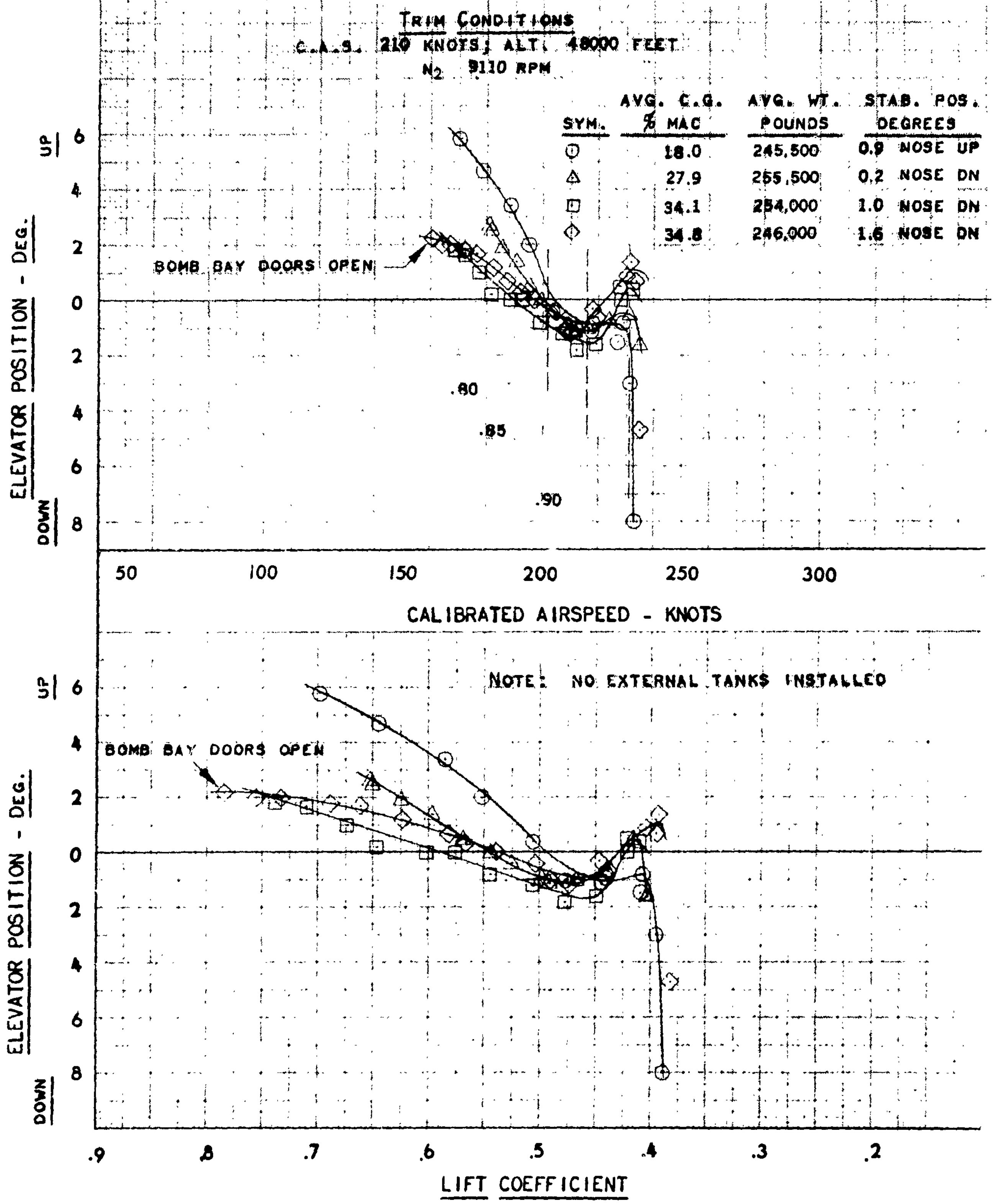
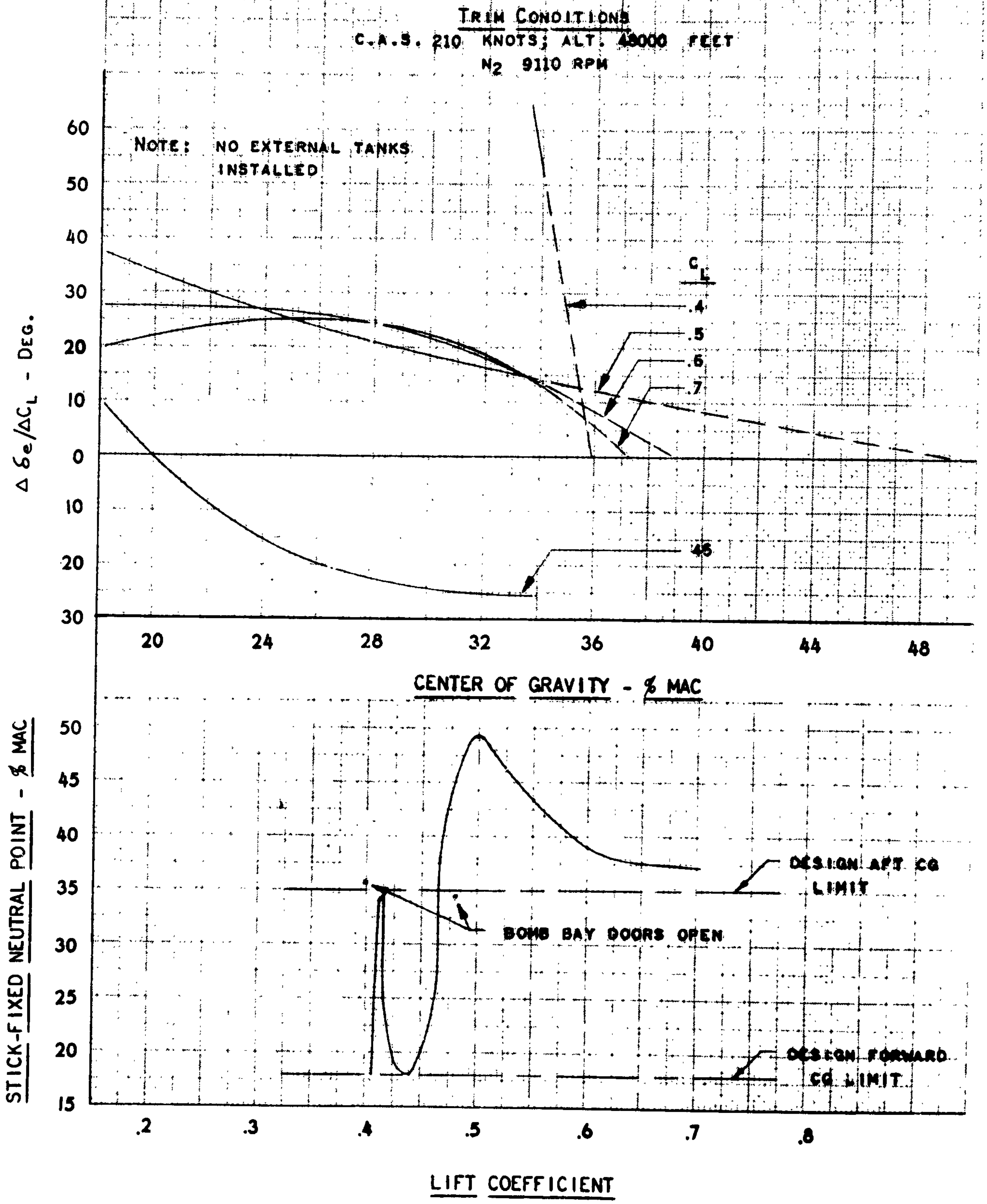


FIGURE NO. 288
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER CONFIGURATION



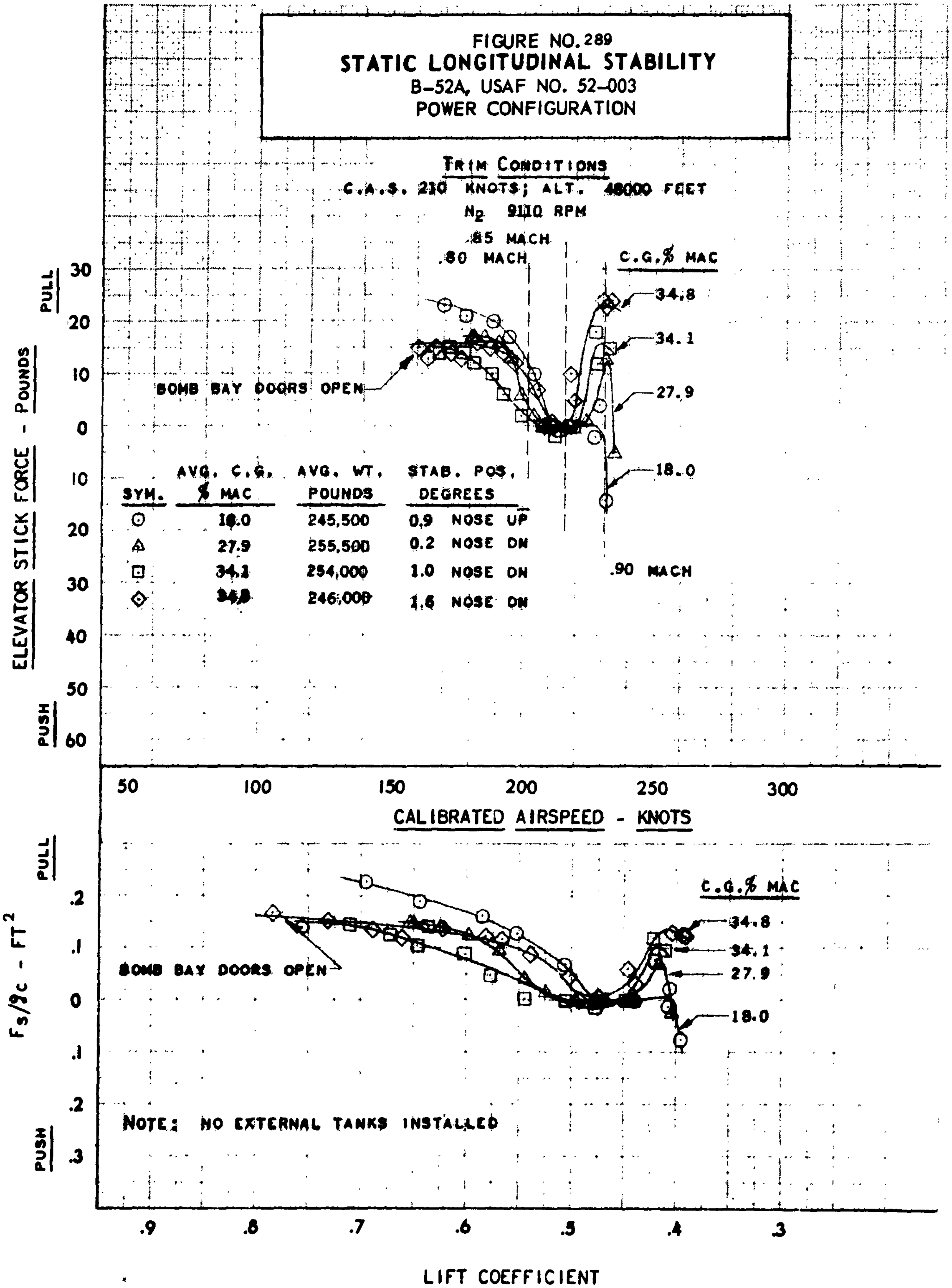


FIGURE NO. 289
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER CONFIGURATION

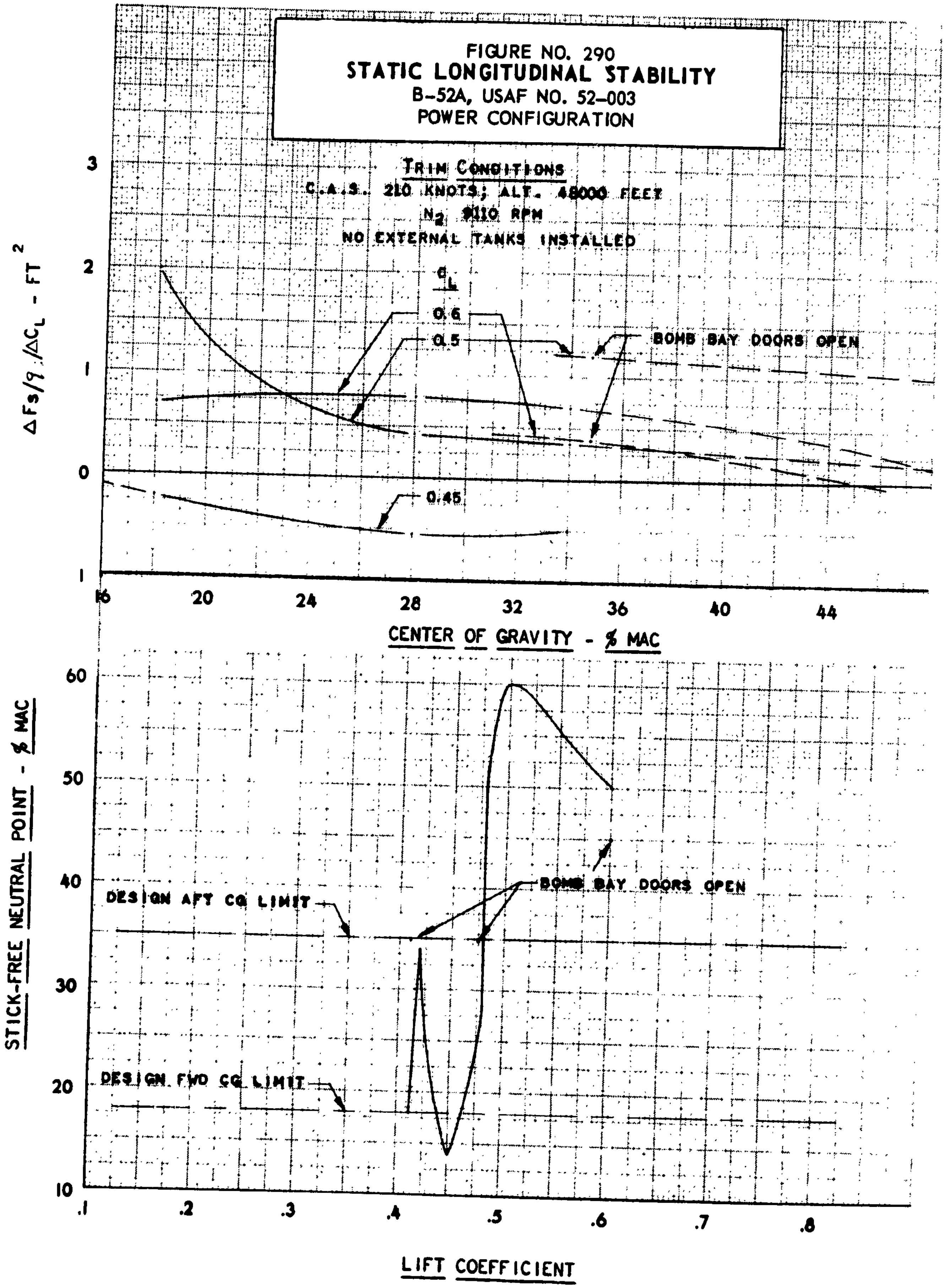


FIGURE NO. 290
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER CONFIGURATION

FIGURE NO. 291
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER CONFIGURATION

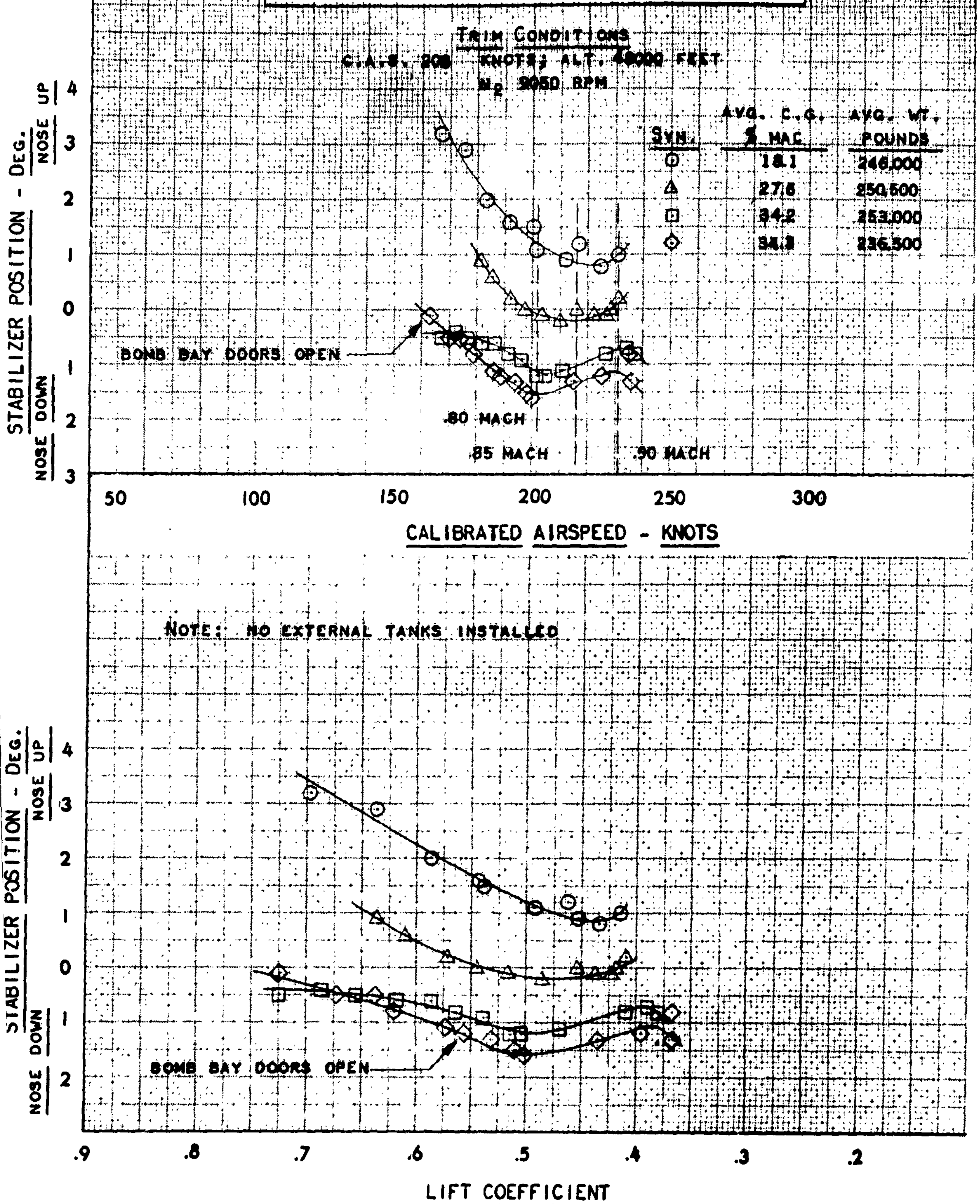


FIGURE NO. 292
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER CONFIGURATION

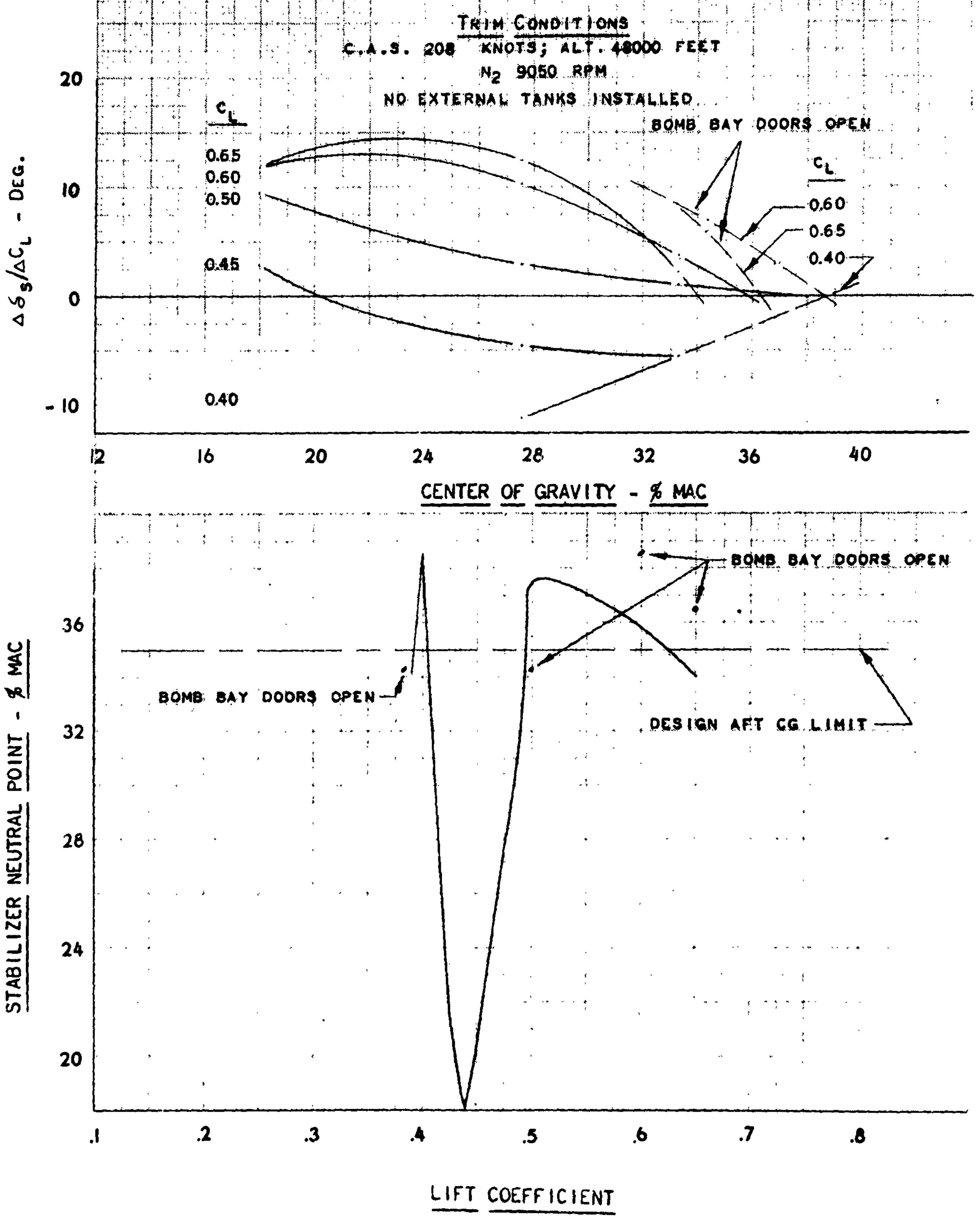
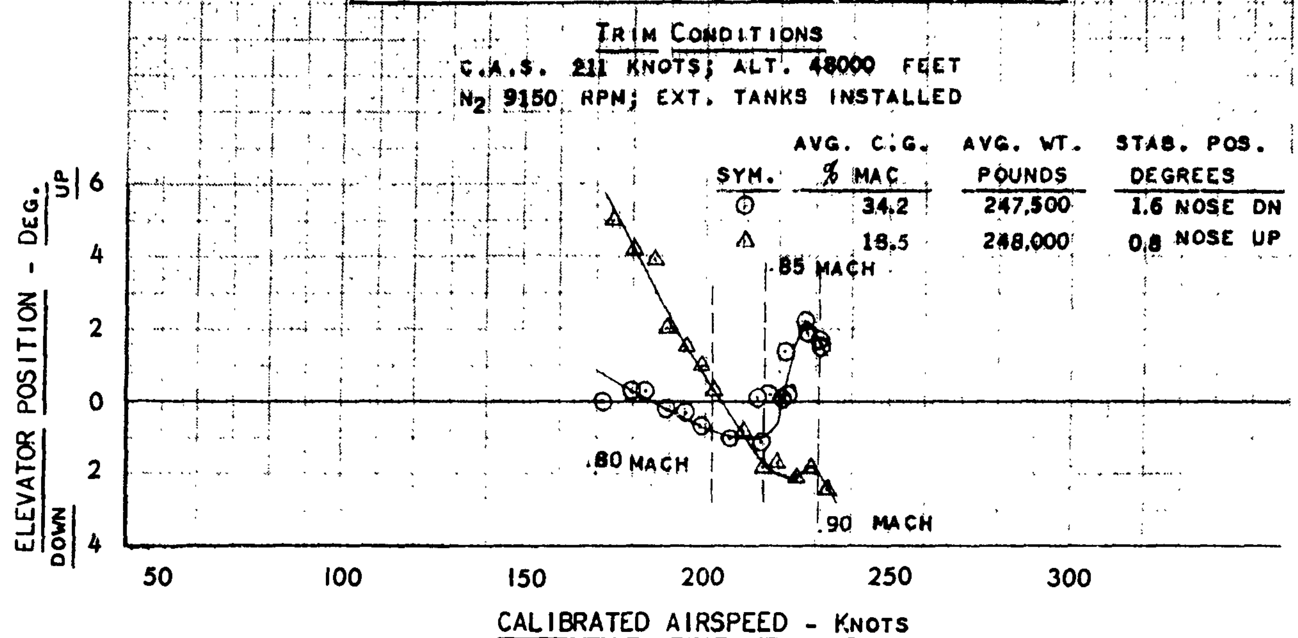


FIGURE NO. 293
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER CONFIGURATION



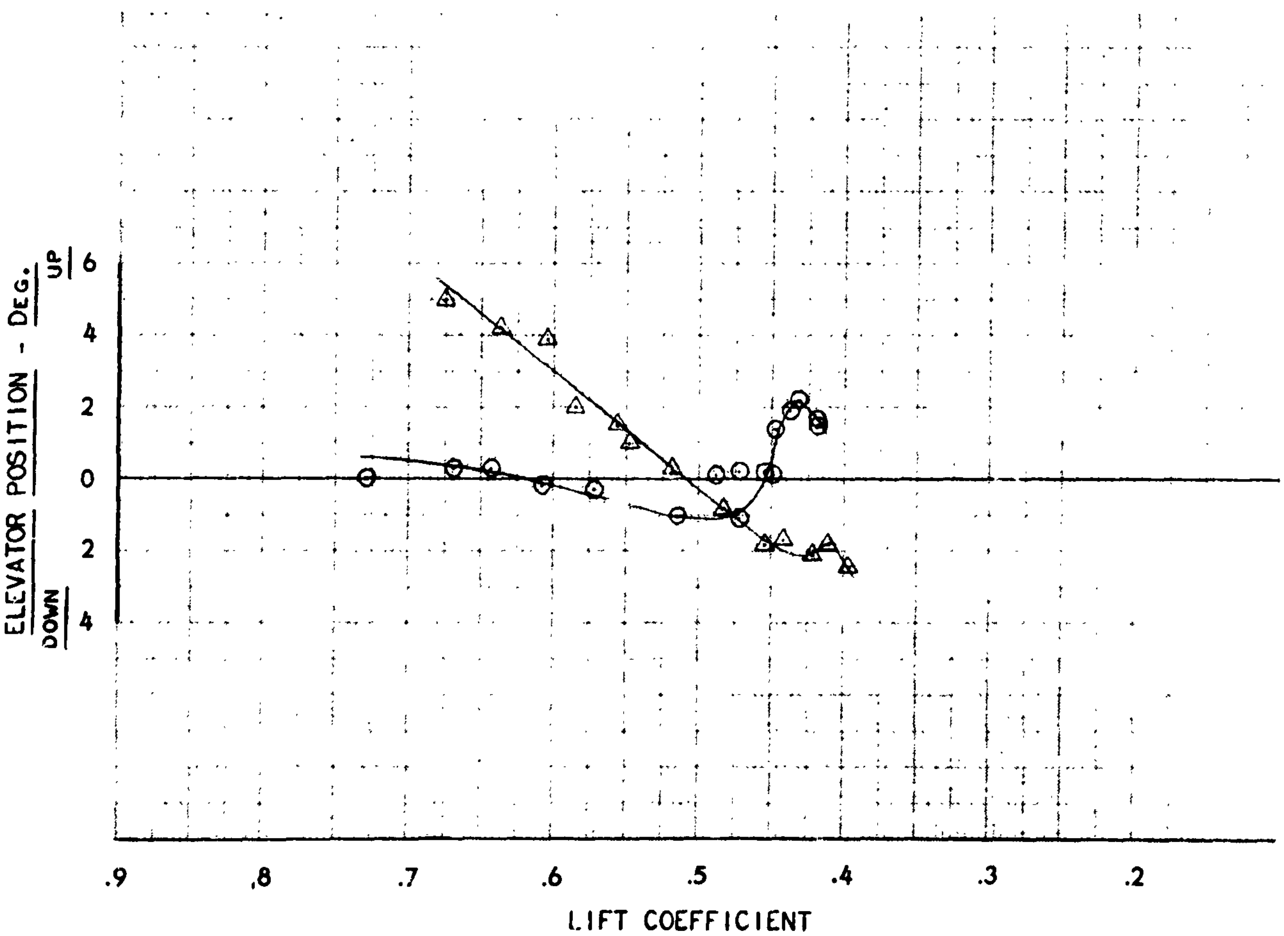


FIGURE NO. 294
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER CONFIGURATION

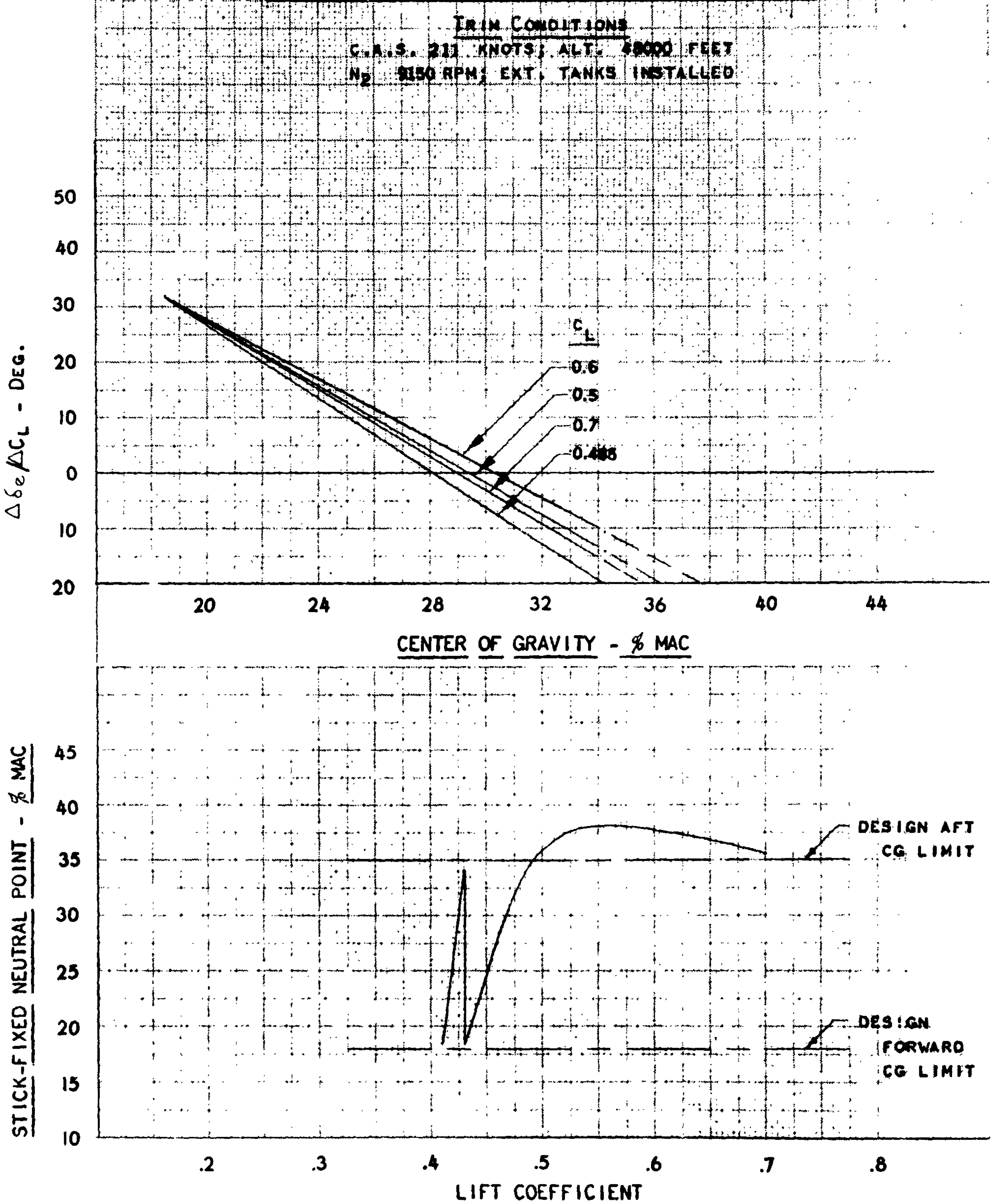
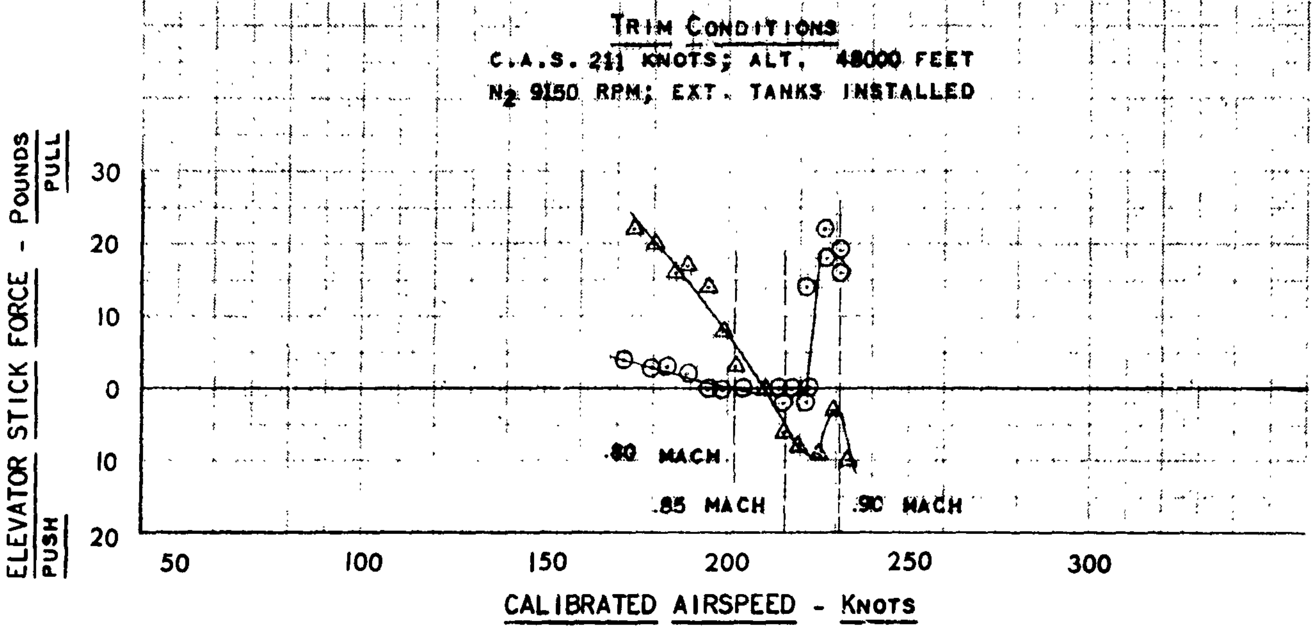


FIGURE NO. 295
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER CONFIGURATION



SYM.	AVG. C.G. % MAC	AVG. WT. POUNDS	STAB. POS. DEGREES
⊙	34.2	247,500	1.6 NOSE DN
△	18.5	248,000	0.8 NOSE UP

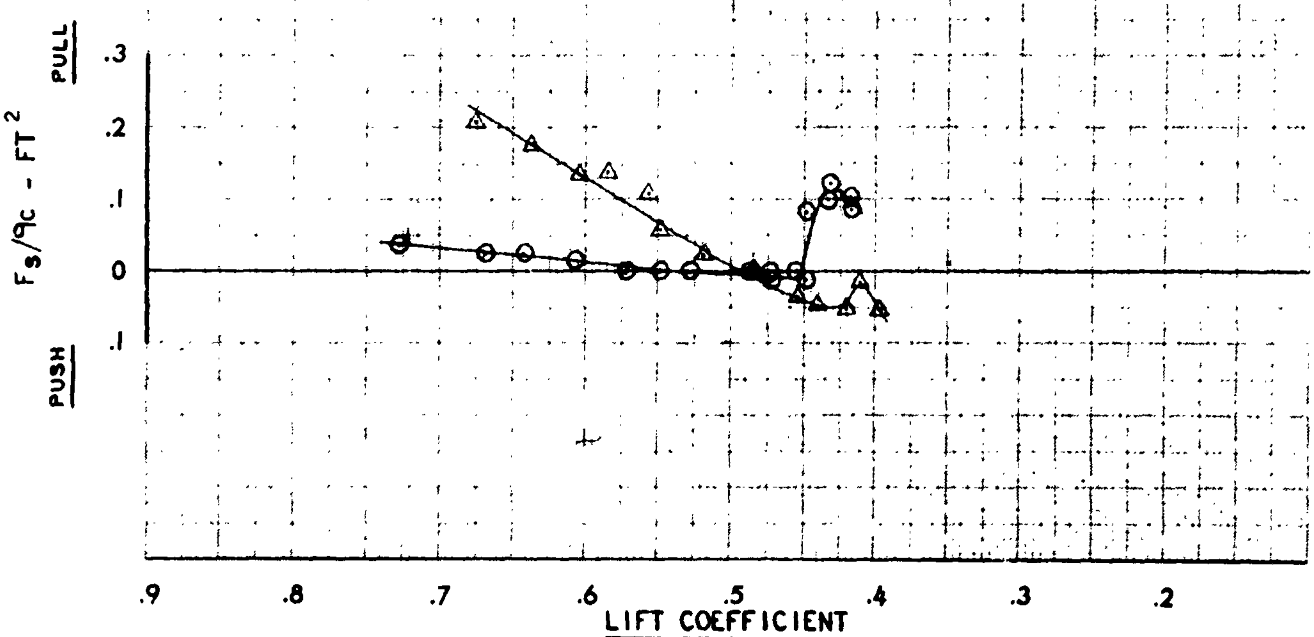
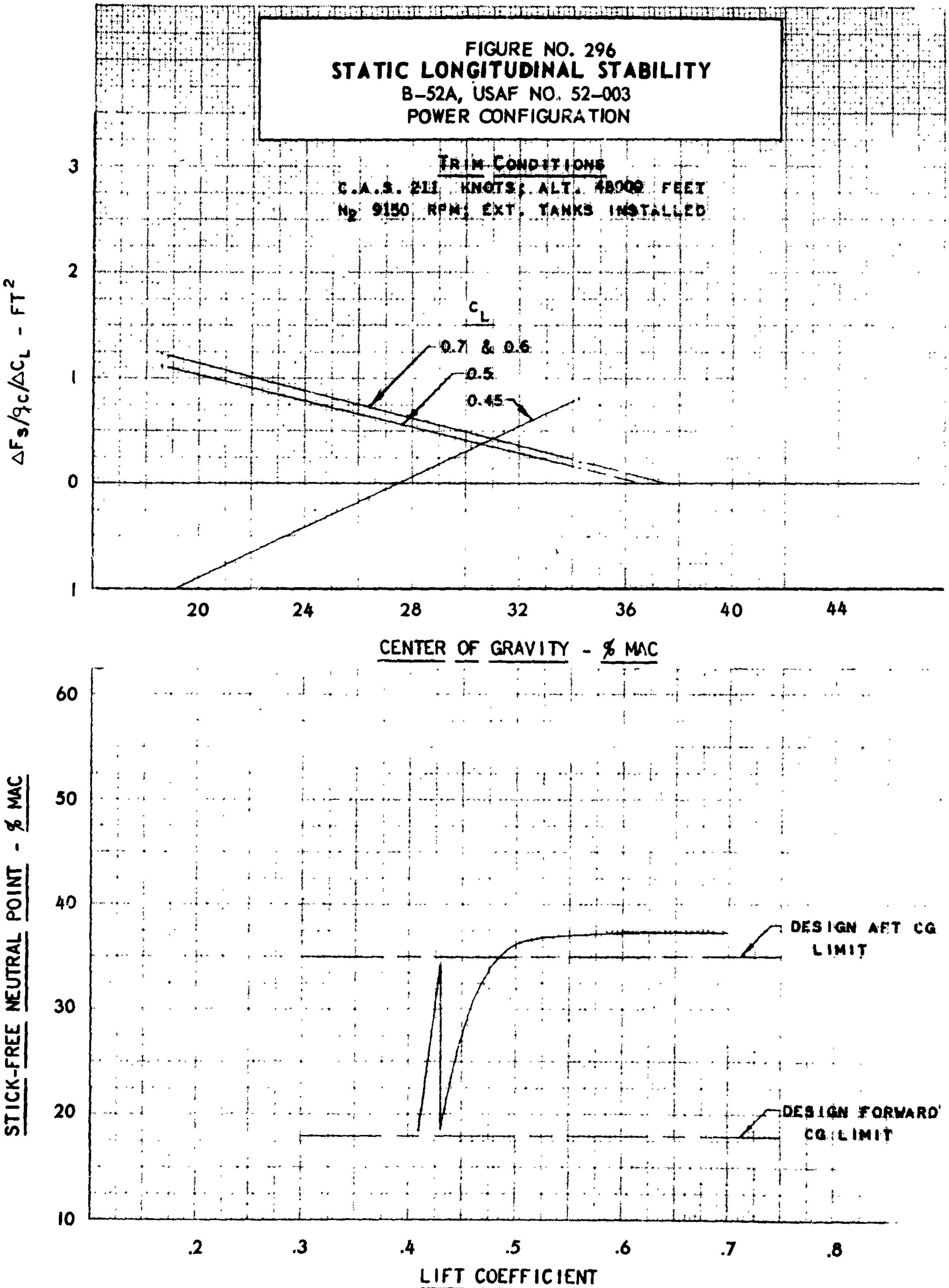


FIGURE NO. 296
STATIC LONGITUDINAL STABILITY
B-52A, USAF NO. 52-003
POWER CONFIGURATION



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LONGITUDINAL TRIM CHANGES

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FOR CONVENIENCE OF

PRESENTING PLOTS

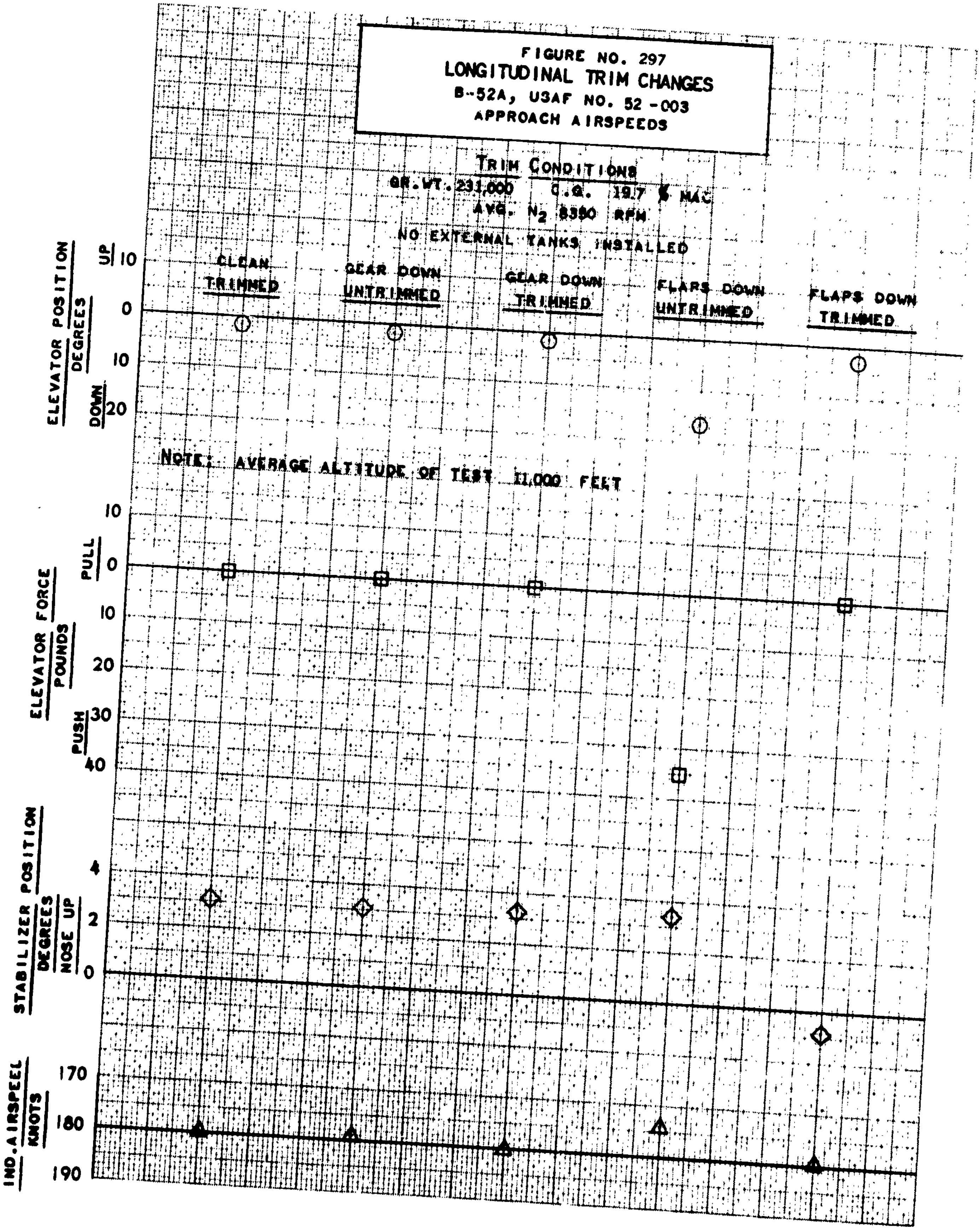
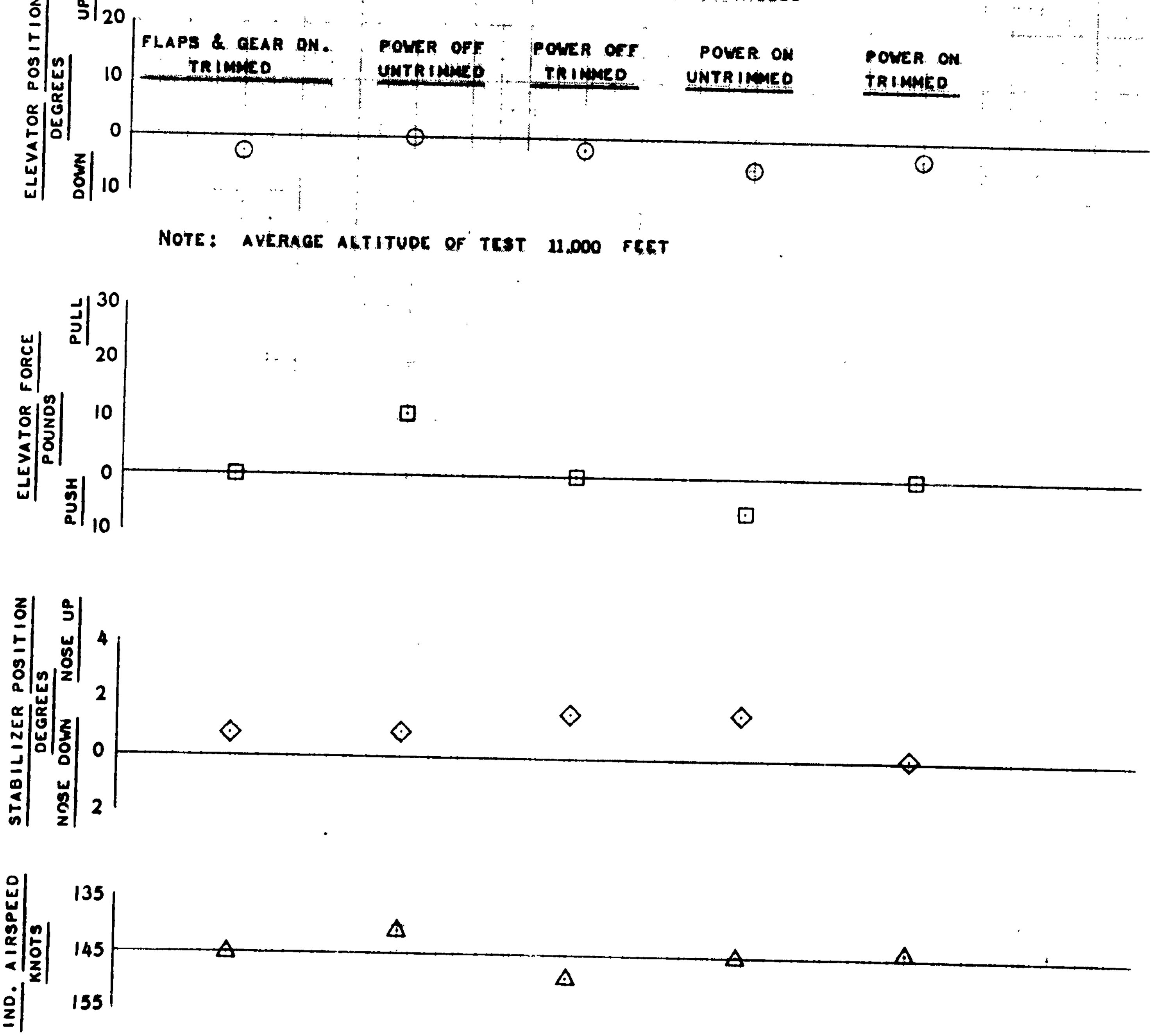


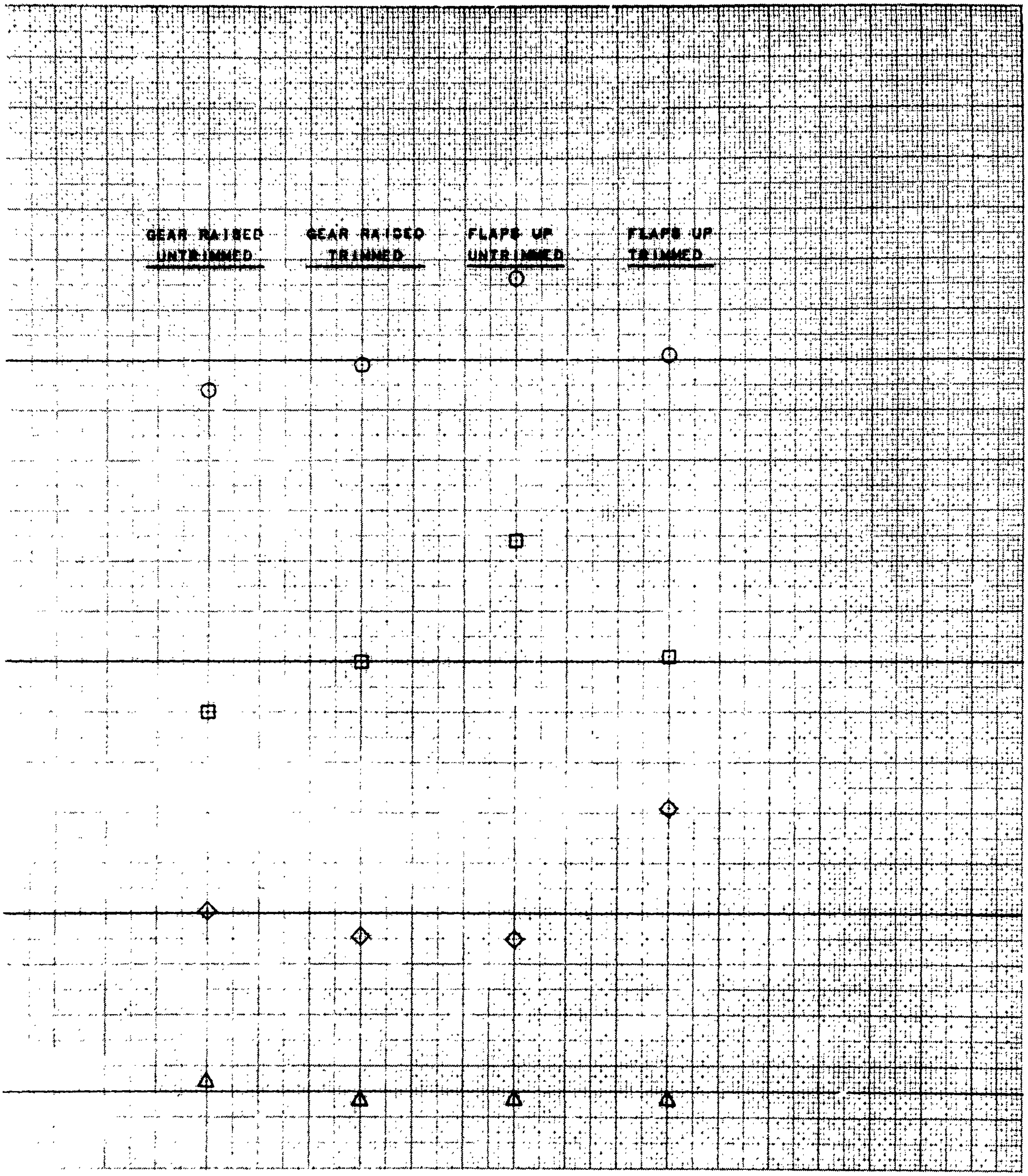
FIGURE NO. 297
LONGITUDINAL TRIM CHANGES
B-52A, USAF NO. 52-003
APPROACH AIRSPEEDS
TRIM CONDITIONS
GR. WT. 231,000 C.G. 19.7 % MAC
AVG. N_2 8390 RPM
NO EXTERNAL TANKS INSTALLED
CLEAN TRIMMED
GEAR DOWN UNTRIMMED
GEAR DOWN TRIMMED
FLAPS DOWN UNTRIMMED
FLAPS DOWN TRIMMED
ELEVATOR POSITION DEGREES
UP
DOWN
NOTE: AVERAGE ALTITUDE OF TEST 11,000 FEET
ELEVATOR FORCE POUNDS
PULL
PUSH
STABILIZER POSITION DEGREES
NOSE UP
IND. AIRSPEED KNOTS

FIGURE NO. 298
LONGITUDINAL TRIM CHANGES
B-52A, USAF NO. 52-003
APPROACH AIRSPEEDS

TRIM CONDITIONS
GR. WT. 228,500 C.G. 19.8 % MAC
AVG. N_2 9070 RPM

NO EXTERNAL TANKS INSTALLED




GEAR RAISED
UNTRIMMED
GEAR RAISED
TRIMMED
FLAPS UP
UNTRIMMED
FLAPS UP
TRIMMED

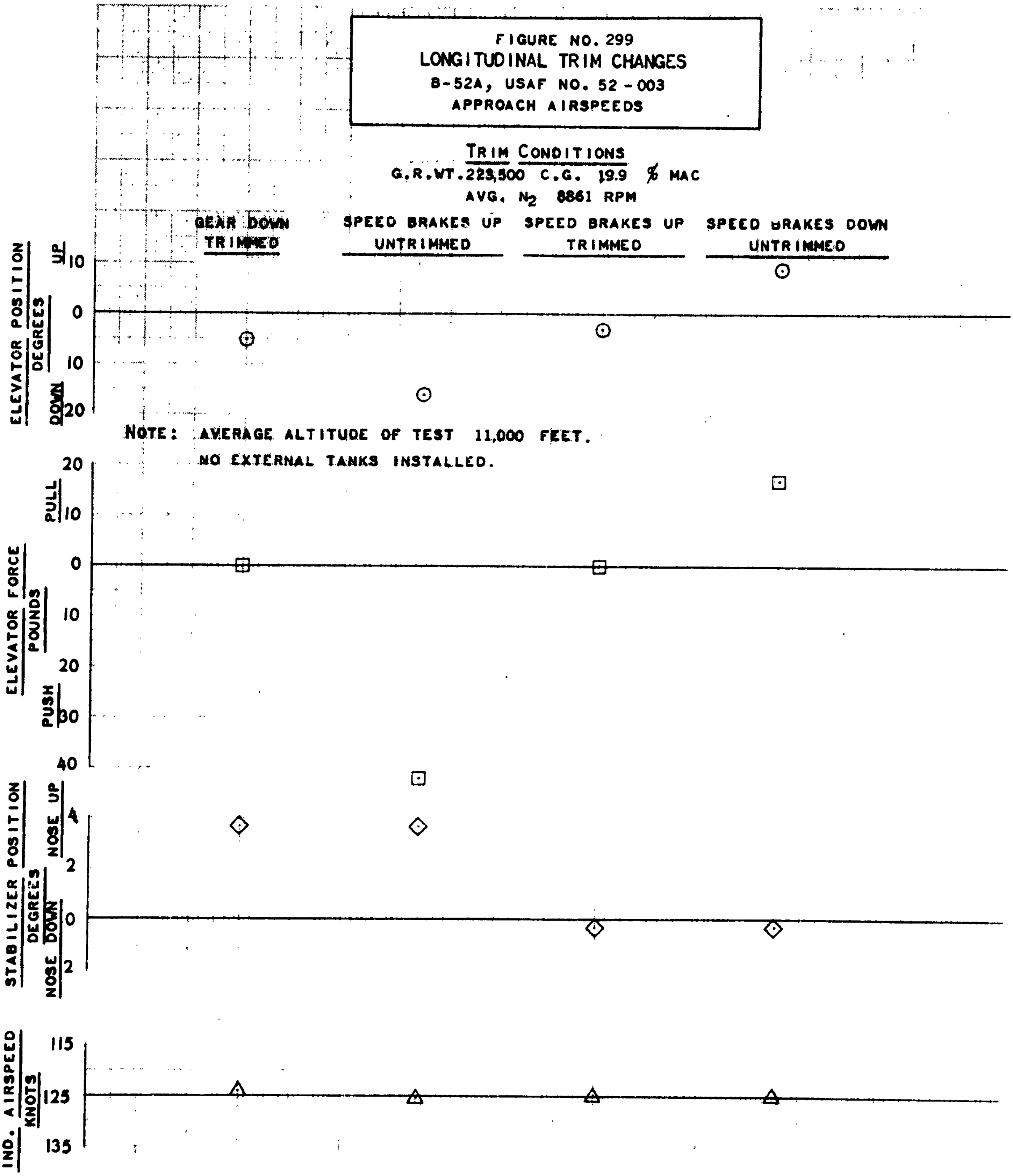


FIGURE NO. 299
LONGITUDINAL TRIM CHANGES
B-52A, USAF NO. 52-003
APPROACH AIRSPEEDS
TRIM CONDITIONS
G.R.WT. 223,500 C.G. 19.9 % MAC
AVG. N2 8861 RPM
GEAR DOWN TRIMMED
SPEED BRAKES UP UNTRIMMED
SPEED BRAKES UP TRIMMED
SPEED BRAKES DOWN UNTRIMMED
ELEVATOR POSITION DEGREES
UP
DOWN
NOTE: AVERAGE ALTITUDE OF TEST 11,000 FEET.
NO EXTERNAL TANKS INSTALLED.
ELEVATOR FORCE POUNDS
PULL
PUSH
STABILIZER POSITION DEGREES
NOSE UP
NOSE DOWN
IND. AIRSPEED KNOTS
115
125
135

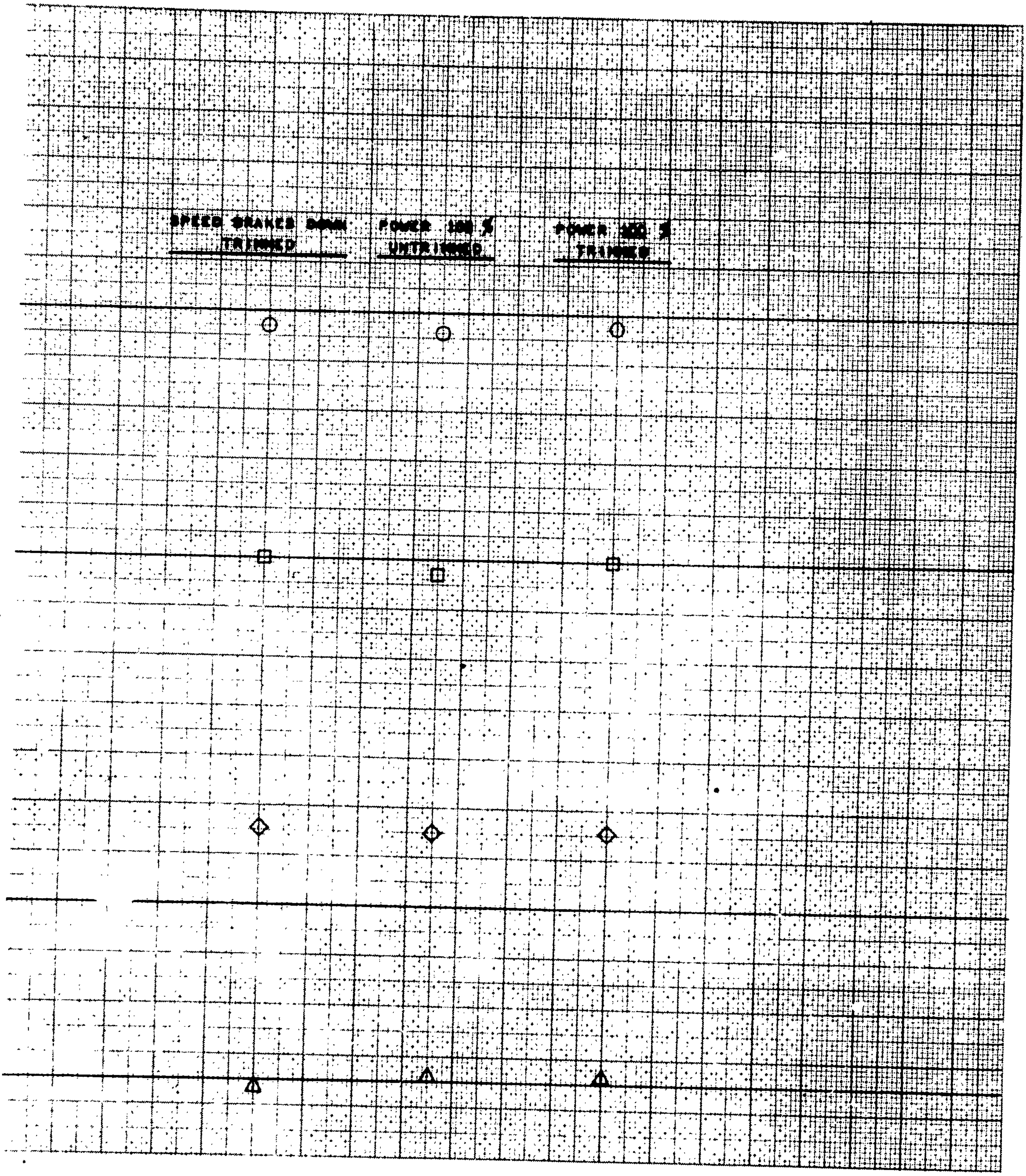
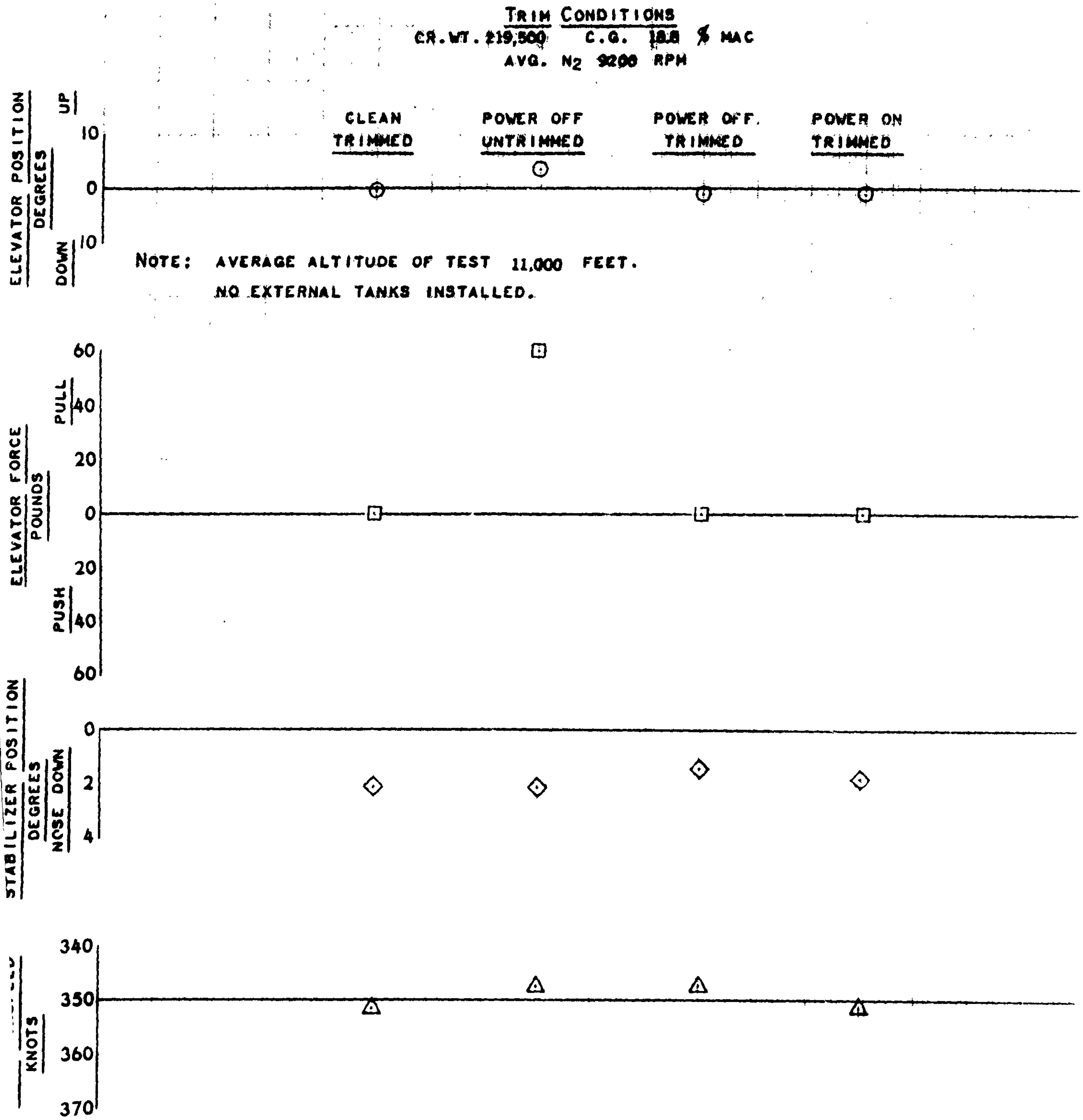
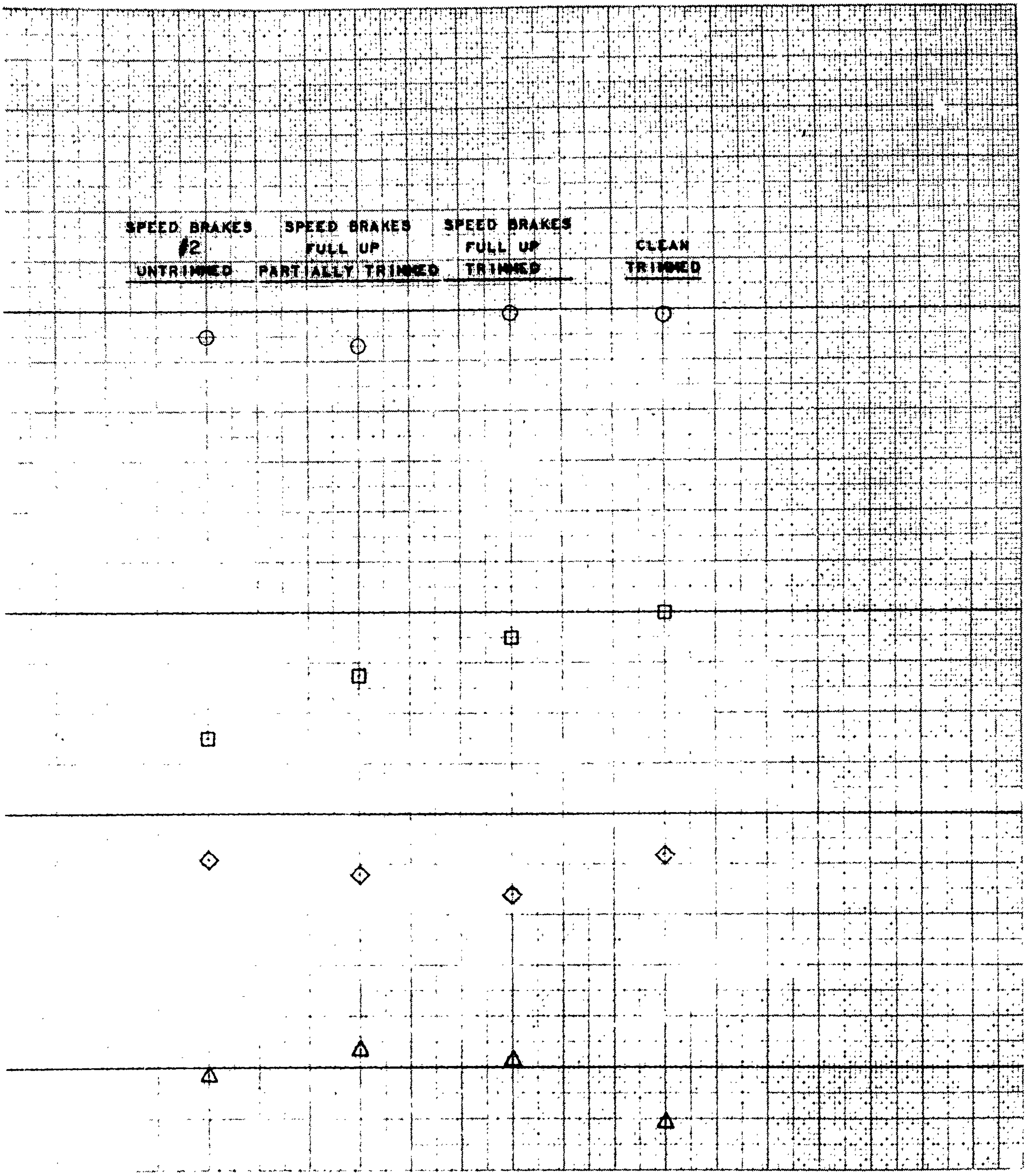

SPEED BRAKES DOWN
TRIMMED
POWER
UNTRIMMED
POWER
TRIMMED

FIGURE NO. 300
LONGITUDINAL TRIM CHANGES
B-52A, USAF NO. 52-003
CRUISE AIRSPEEDS




SPEED BRAKES
#2
UNTRIMMED
SPEED BRAKES
FULL UP
PARTIALLY TRIMMED
SPEED BRAKES
FULL UP
TRIMMED
CLEAN
TRIMMED

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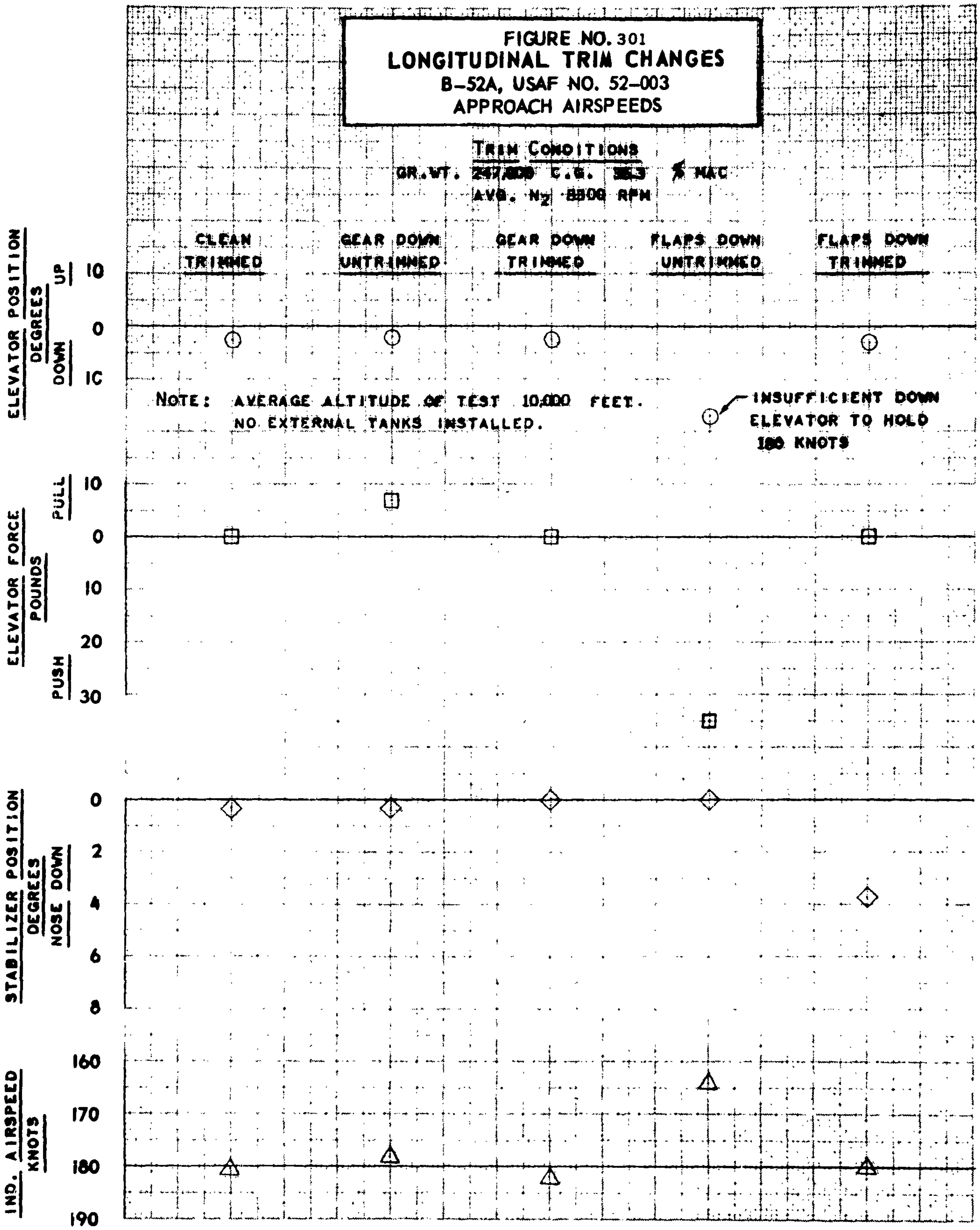
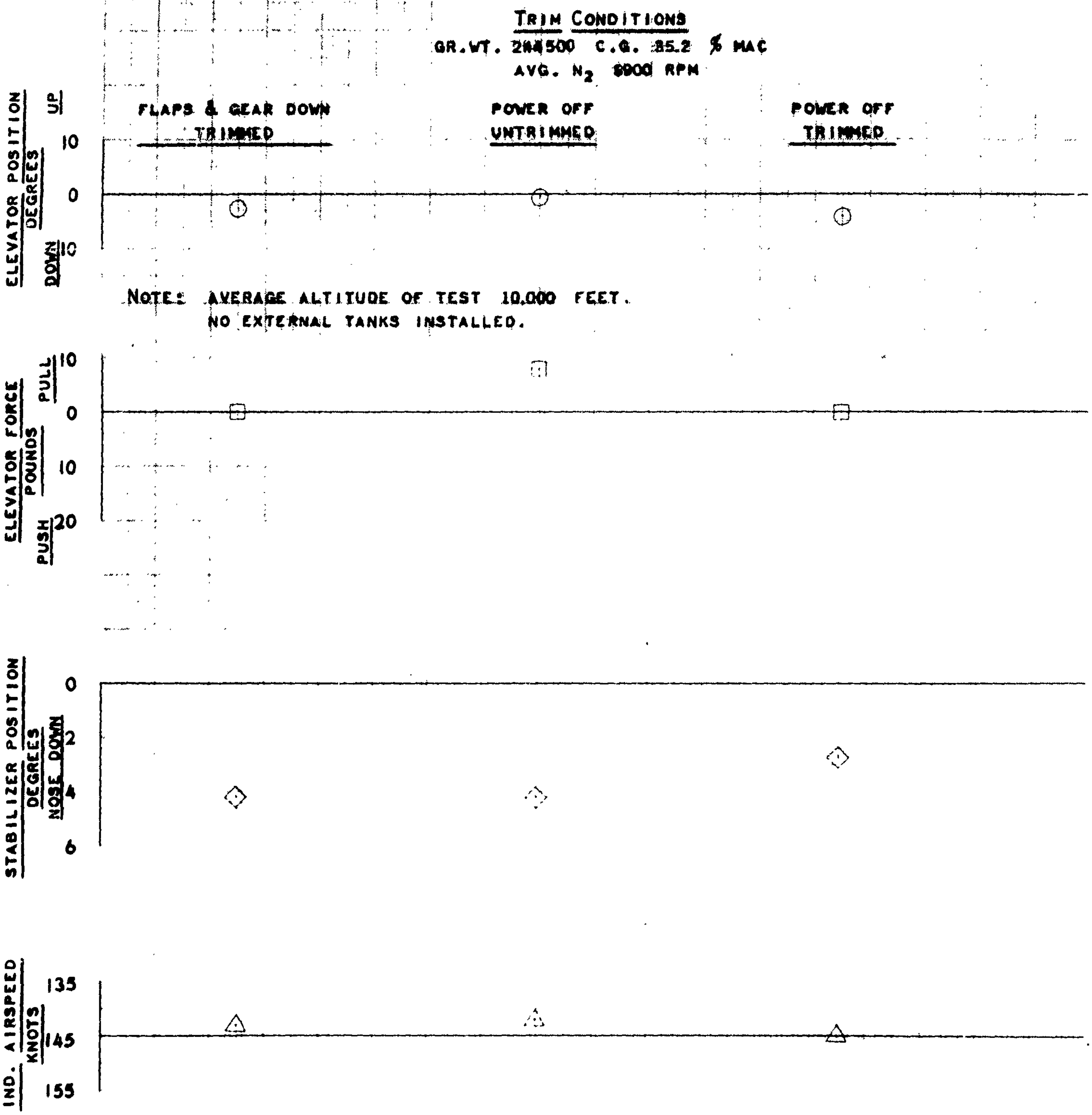
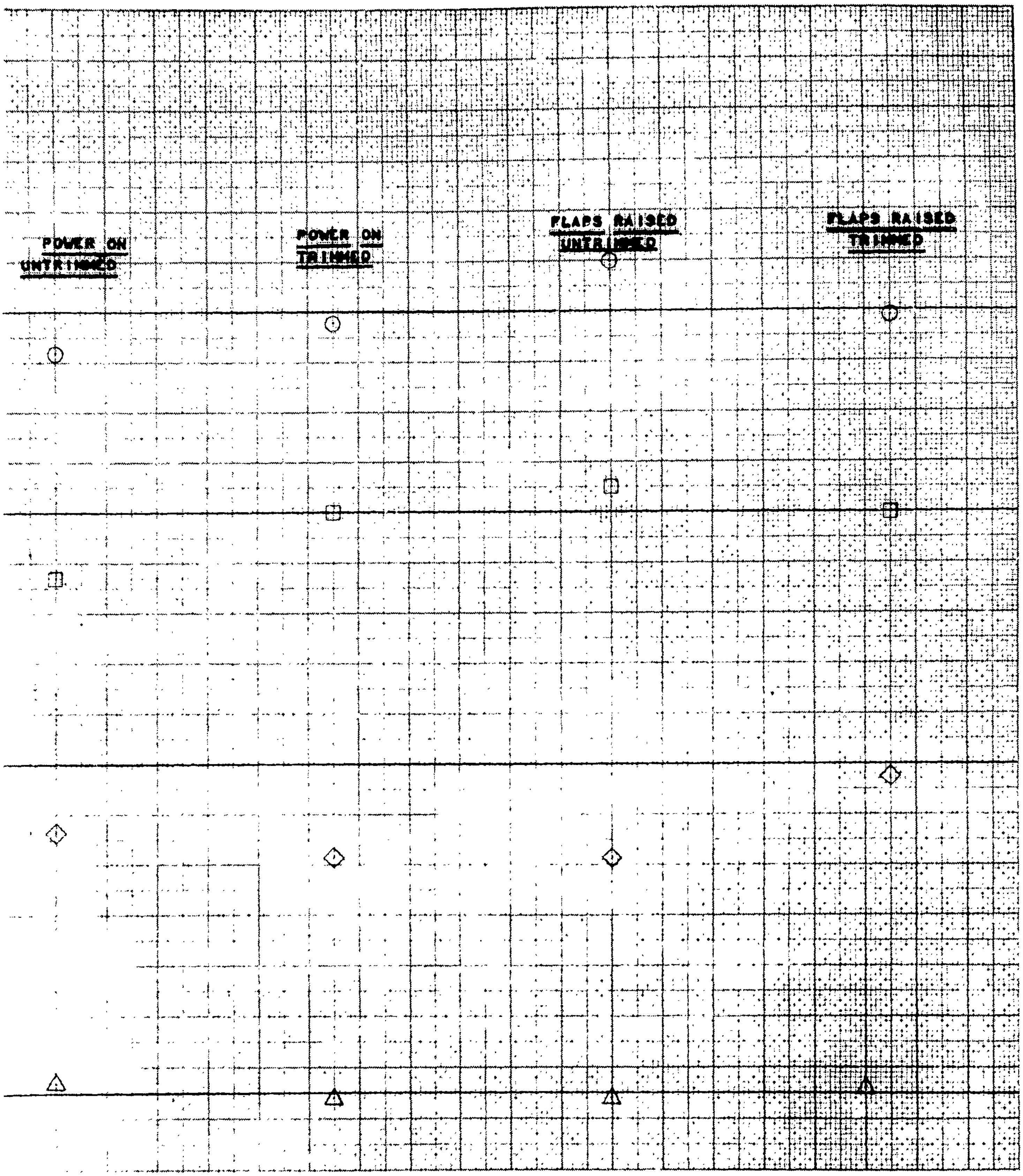


FIGURE NO. 301
LONGITUDINAL TRIM CHANGES
B-52A, USAF NO. 52-003
APPROACH AIRSPEEDS
TRIM CONDITIONS
GR. WT. 247,000 C.G. 25.3 % MAC
AVG. N2 8800 RPM
CLEAN TRIMMED
GEAR DOWN UNTRIMMED
GEAR DOWN TRIMMED
FLAPS DOWN UNTRIMMED
FLAPS DOWN TRIMMED
ELEVATOR POSITION DEGREES
UP
DOWN
10
0
10
NOTE: AVERAGE ALTITUDE OF TEST 10,000 FEET.
NO EXTERNAL TANKS INSTALLED.
INSUFFICIENT DOWN ELEVATOR TO HOLD 180 KNOTS
ELEVATOR FORCE POUNDS
PULL
PUSH
10
0
10
20
30
STABILIZER POSITION DEGREES NOSE DOWN
0
2
4
6
8
IND. AIRSPEED KNOTS
160
170
180
190

FIGURE NO. 302
LONGITUDINAL TRIM CHANGES
B-52A, USAF NO. 52-003
APPROACH AIRSPEEDS




POWER ON
UNTRIMMED
POWER ON
TRIMMED
FLAPS RAISED
UNTRIMMED
FLAPS RAISED
TRIMMED

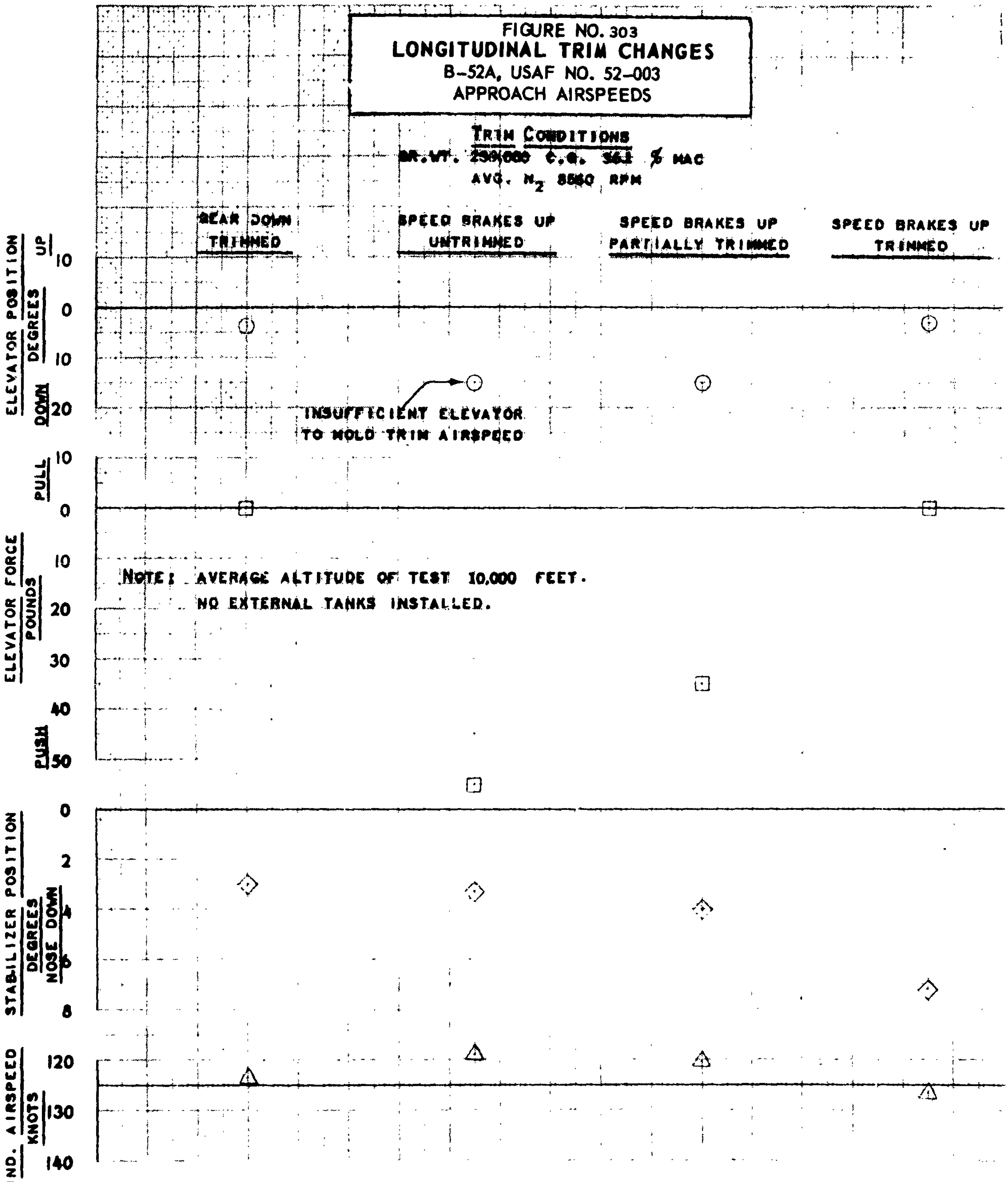
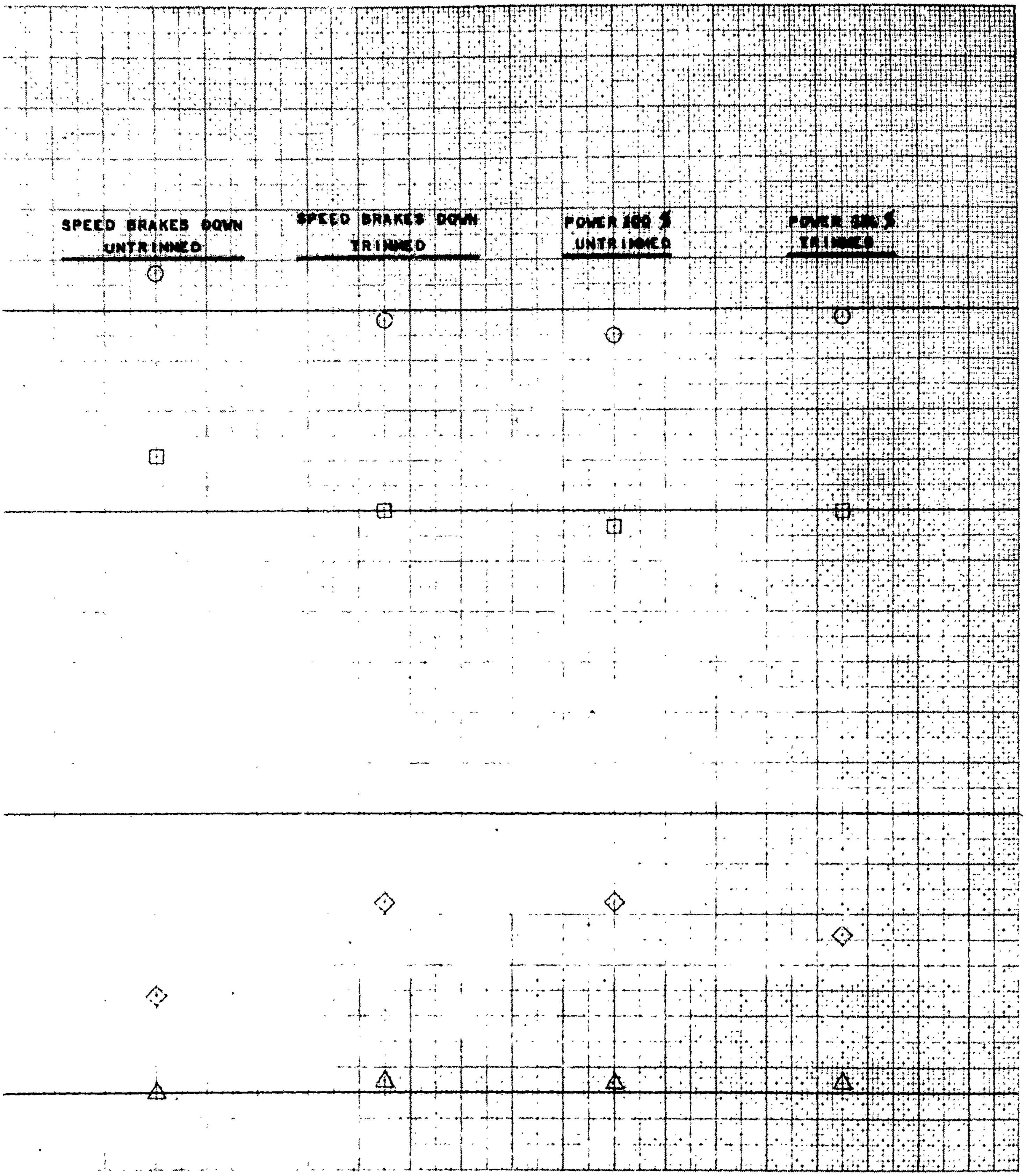


FIGURE NO. 303
LONGITUDINAL TRIM CHANGES
B-52A, USAF NO. 52-003
APPROACH AIRSPEEDS
TRIM CONDITIONS
GR. WT. 230,000 C.G. 36.1 % MAC
AVG. N2 8550 RPM
GEAR DOWN TRIMMED
SPEED BRAKES UP UNTRIMMED
SPEED BRAKES UP PARTIALLY TRIMMED
SPEED BRAKES UP TRIMMED
ELEVATOR POSITION DEGREES
UP
DOWN
INSUFFICIENT ELEVATOR TO HOLD TRIM AIRSPEED
ELEVATOR FORCE POUNDS
PULL
PUSH
NOTE: AVERAGE ALTITUDE OF TEST 10,000 FEET.
NO EXTERNAL TANKS INSTALLED.
STABILIZER POSITION DEGREES
NOSE DOWN
IND. AIRSPEED KNOTS
10
0
10
20
10
0
10
20
30
40
50
0
2
4
6
8
120
130
140


SPEED BRAKES DOWN
UNTRIMMED
SPEED BRAKES DOWN
TRIMMED
POWER 100 %
UNTRIMMED

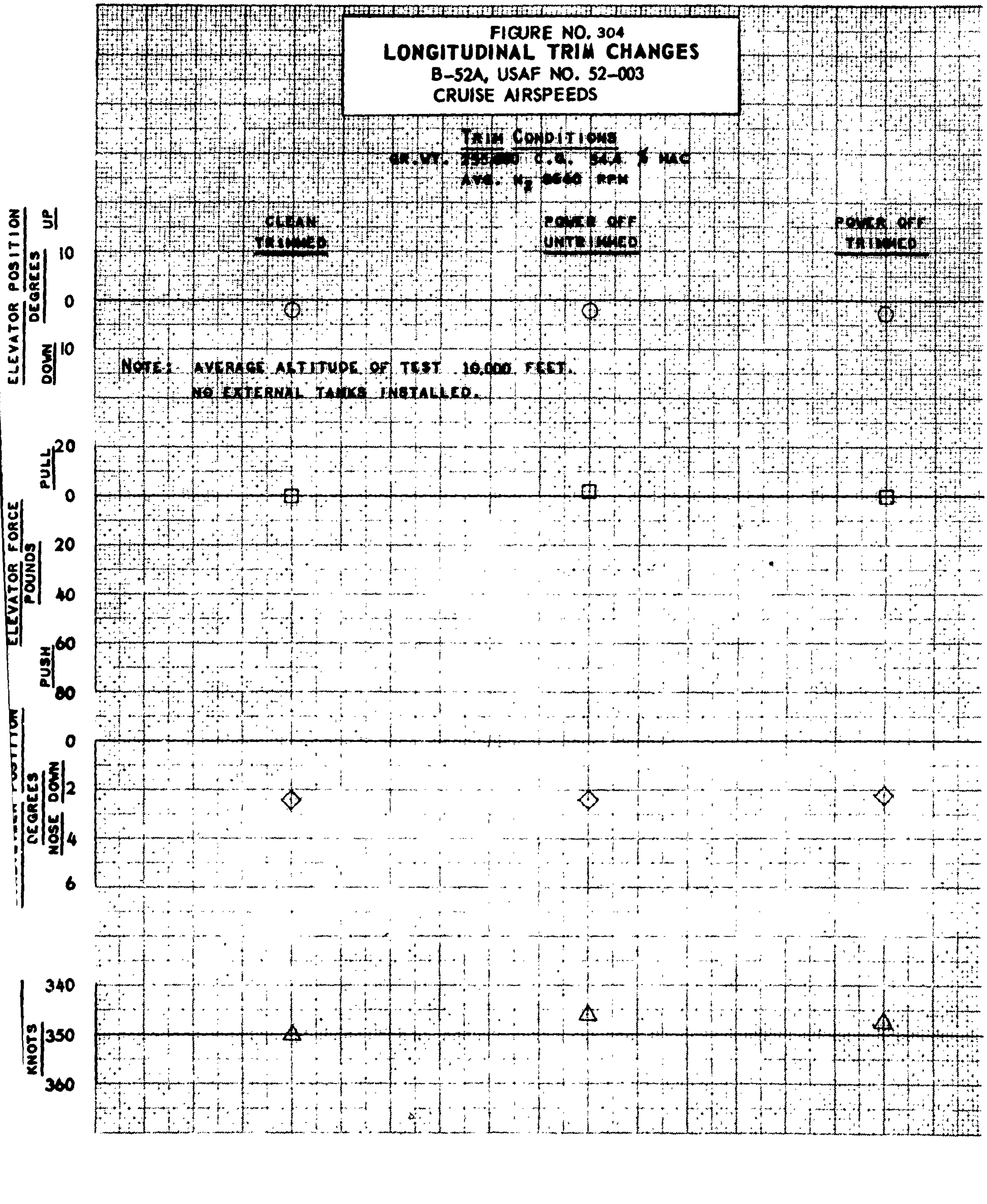
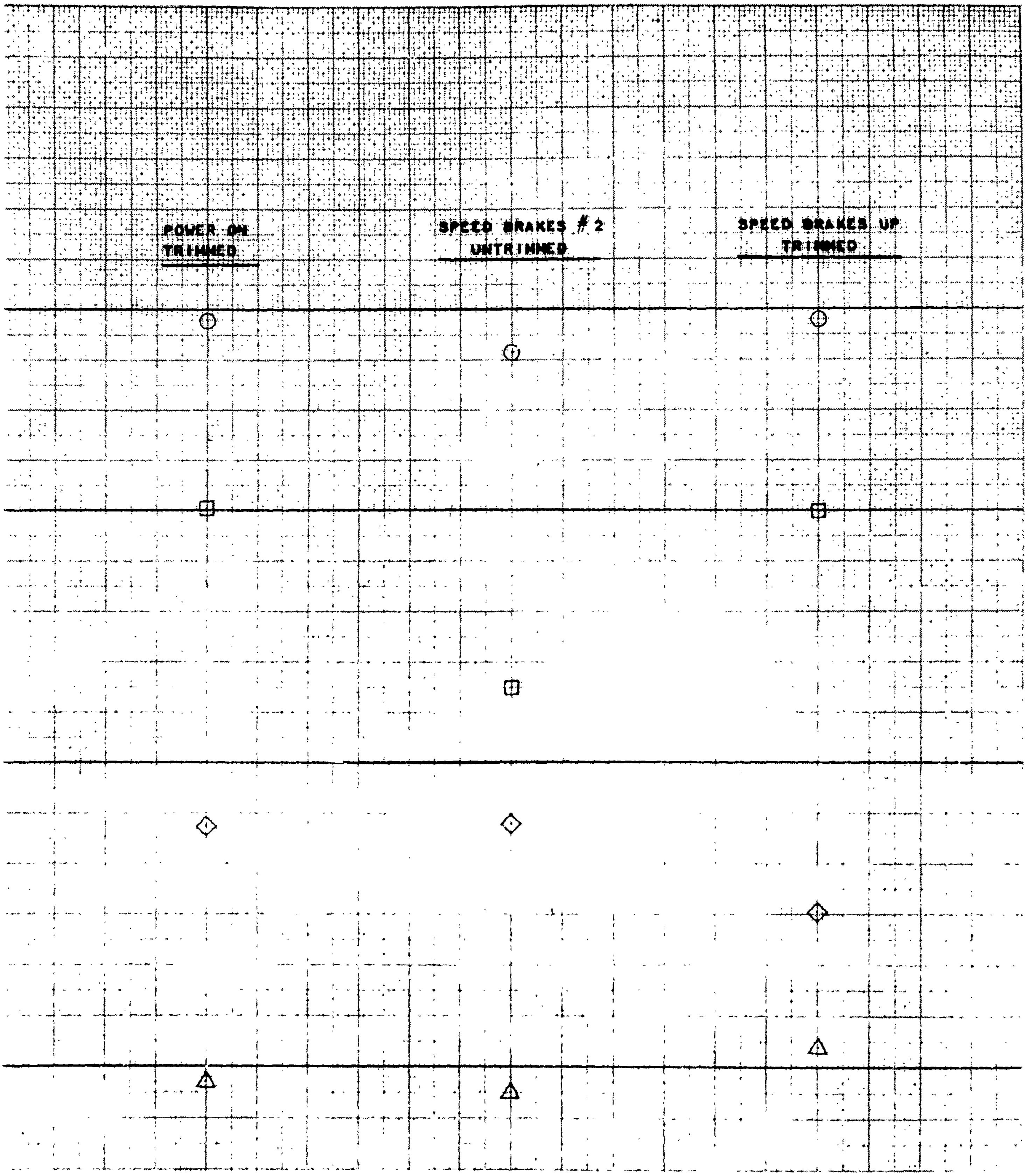


FIGURE NO. 304
LONGITUDINAL TRIM CHANGES
B-52A, USAF NO. 52-003
CRUISE AIRSPEEDS


POWER ON
TRIMMED
SPEED BRAKES # 2
UNTRIMMED
SPEED BRAKES UP
TRIMMED

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FOR CONVENIENCE OF

PRESENTING PLOTS

DYNAMIC LONGITUDINAL STABILITY

FIGURE NO. 305

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

POWER APPROACH CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	130.0	KNOTS ;	ALTITUDE	10,000	FEET
C.G.	18.9	% MAC;	WEIGHT	230,000	LBS.
AVG. N2	8540	RPM;	STABILIZER POSITION	3.0 DEG. L. E. DN.	

NO EXTERNAL TANKS INSTALLED

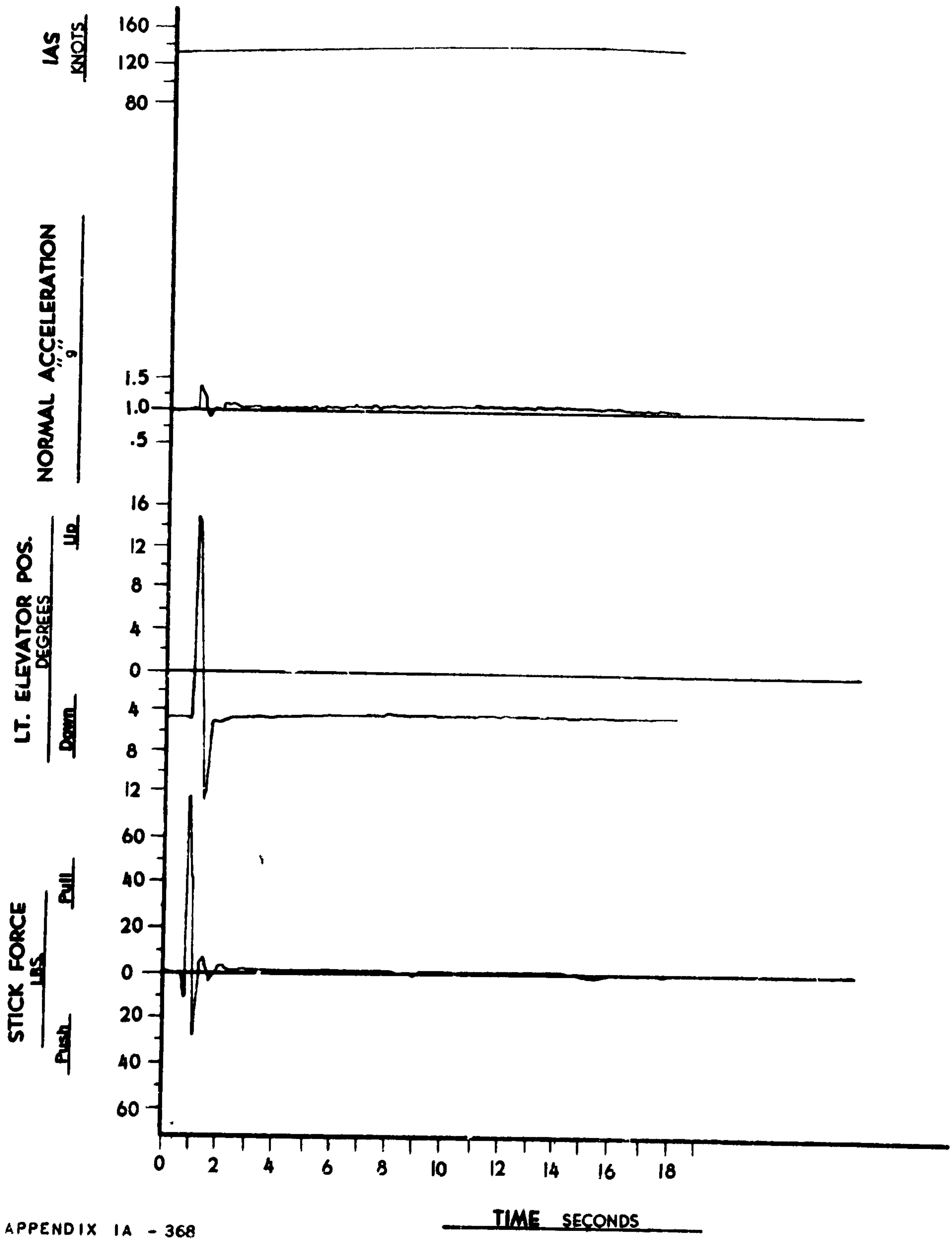


FIGURE NO. 306

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

POWER APPROACH CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 130.0 KNOTS : ALTITUDE 10,000 FEET
C.G. 18.9 % MAC; WEIGHT 230,000 LBS.
AVG. N2 8540 RPM; STABILIZER POSITION 3.0 DEG. L. E. DN.

NO EXTERNAL TANKS INSTALLED

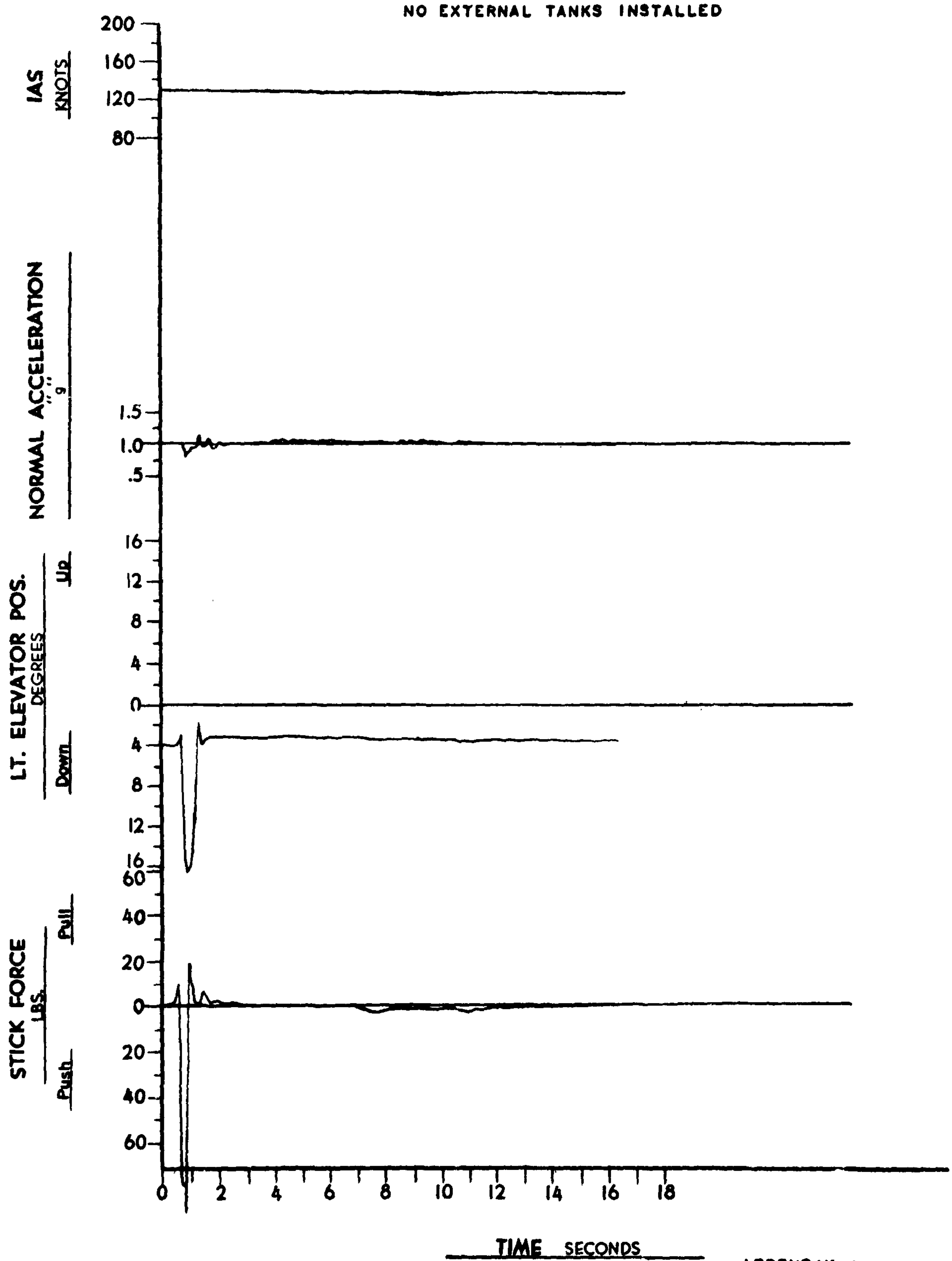


FIGURE NO. 307

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

POWER APPROACH CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 131.5 KNOTS ; ALTITUDE 9,500 FEET
C.G. 34.8 % MAC; WEIGHT 235,000 LBS.
AVG. N2 9000 RPM; STABILIZER POSITION 3.5 DEG. L. E. UP

NO EXTERNAL TANKS INSTALLED

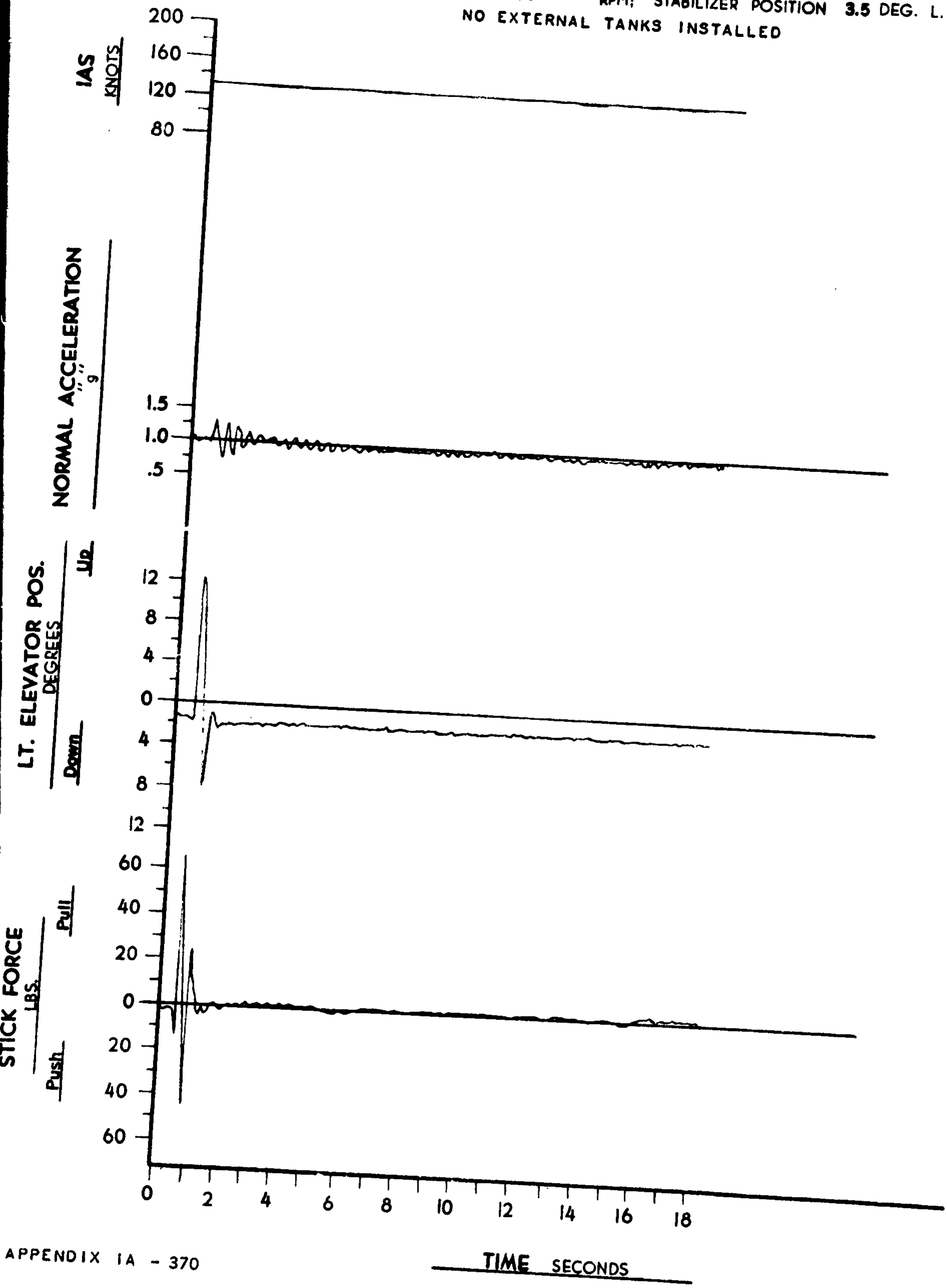


FIGURE NO. 308

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

POWER APPROACH CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 131.5 KNOTS ; ALTITUDE 9,500 FEET
C.G. 34.8 % MAC; WEIGHT 235,000 LBS.
AVG. N_2 9000 RPM; STABILIZER POSITION 3.5 DEG. L. E. UP

NO EXTERNAL TANKS INSTALLED

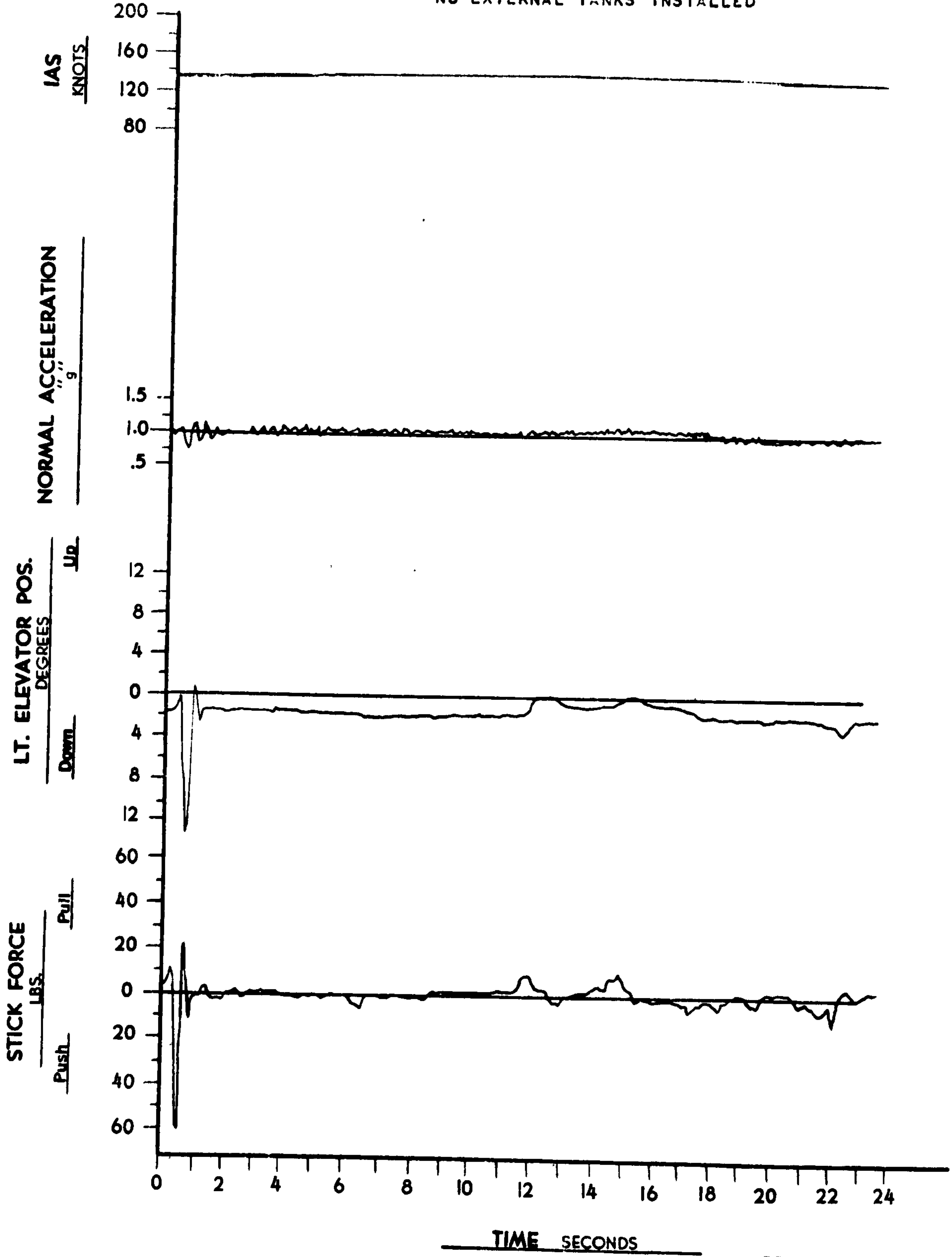


FIGURE NO. 309

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	223.5	KNOTS ;	ALTITUDE	29,700	FEET
C.G.	18.9	% MAC;	WEIGHT	252,500	LBS.
AVG. N2	8250	RPM;	STABILIZER POSITION	1.1	DEG. L. E. DN.

NO EXTERNAL TANKS INSTALLED

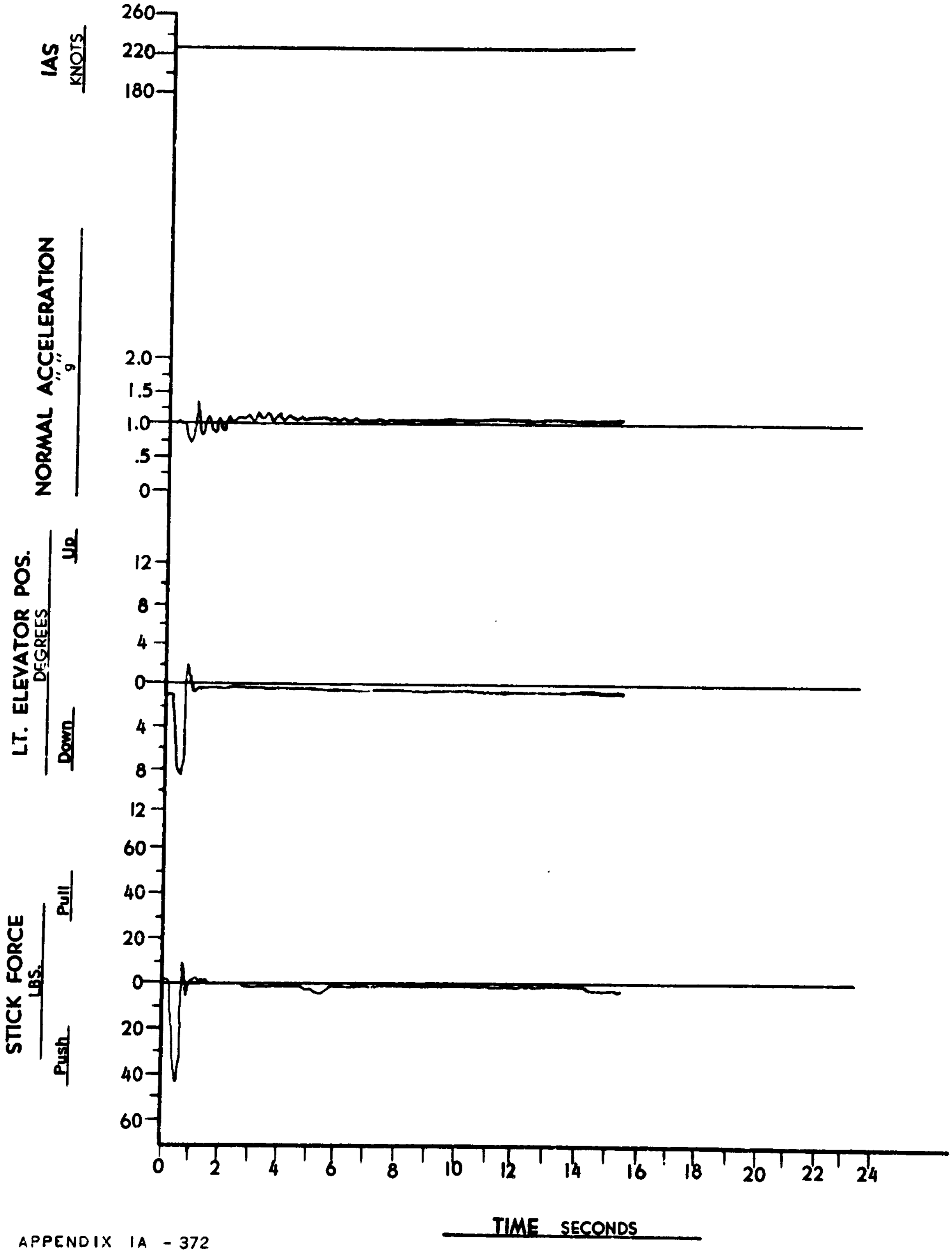


FIGURE NO. 310

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION ; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	223.5	KNOTS ;	ALTITUDE	29,700	FEET
C.G.	18.9	% MAC;	WEIGHT	252,500	LBS.
AVG. N2	8250	RPM;	STABILIZER POSITION	1.1	DEG. L. E. DN.

NO EXTERNAL TANKS INSTALLED

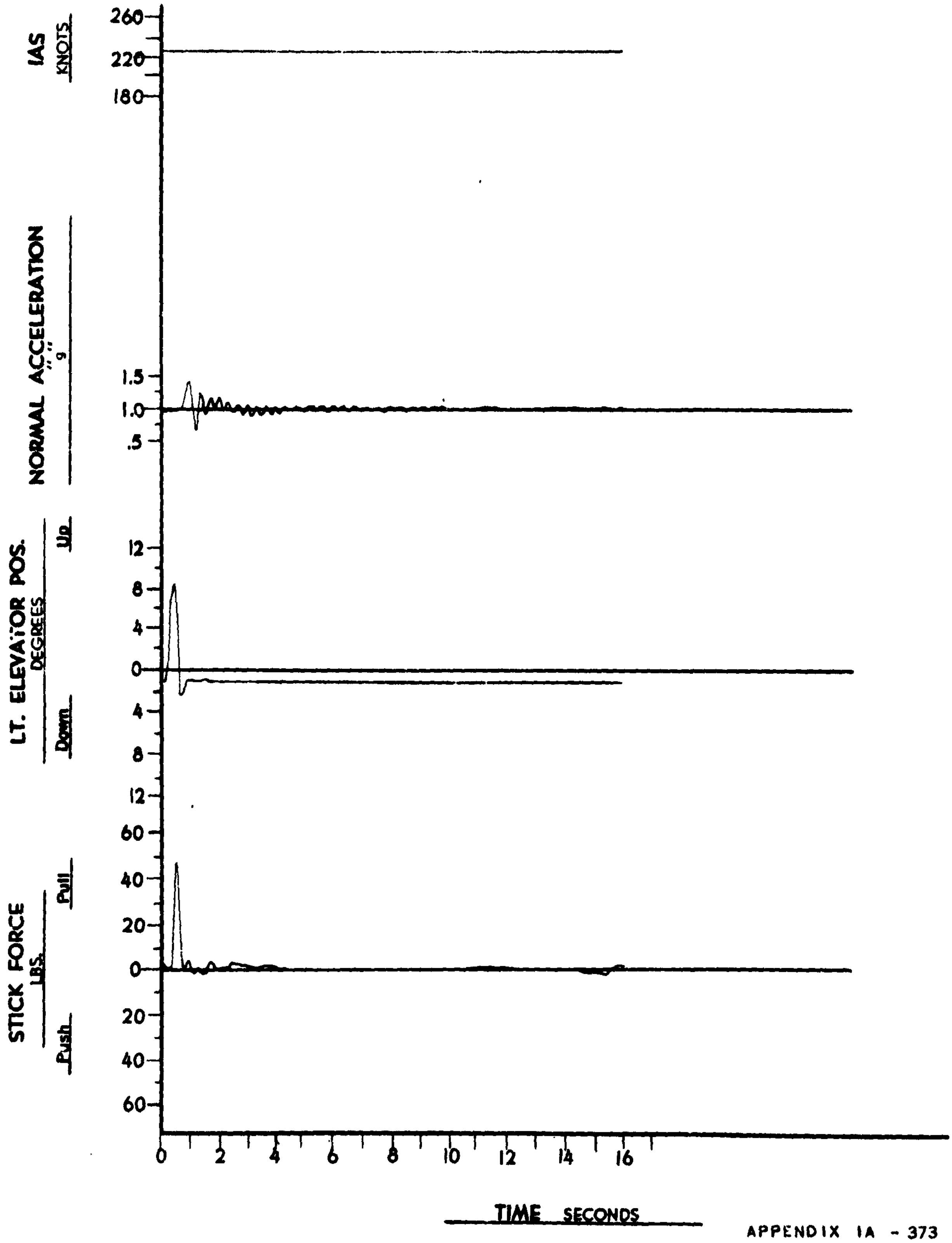


FIGURE NO. 311

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 222.5 KNOTS; ALTITUDE 29,700 FEET
C.G. 35.5 % MAC; WEIGHT 258,500 LBS.
AVG. N2 8270 RPM; STABILIZER POSITION 1.4 DEG. L. E. UP
NO EXTERNAL TANKS INSTALLED

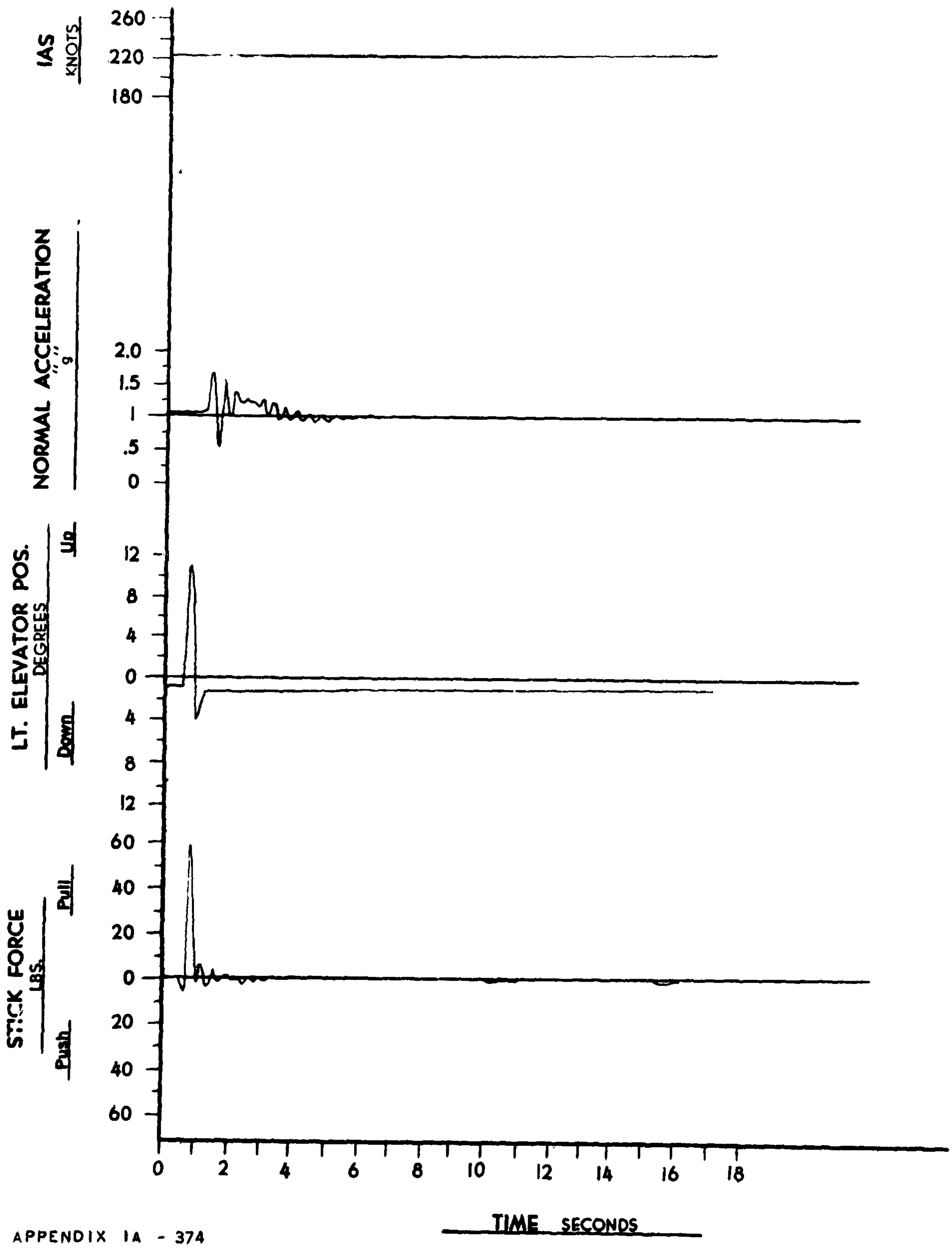


FIGURE NO. 312

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	222.5	KNOTS;	ALTITUDE	29,700	FEET
C.G.	35.5	% MAC;	WEIGHT	258,500	LBS.
AVG. N_2	3270	RPM;	STABILIZER POSITION	1.4 DEG. L. E. UP	

NO EXTERNAL TANKS INSTALLED

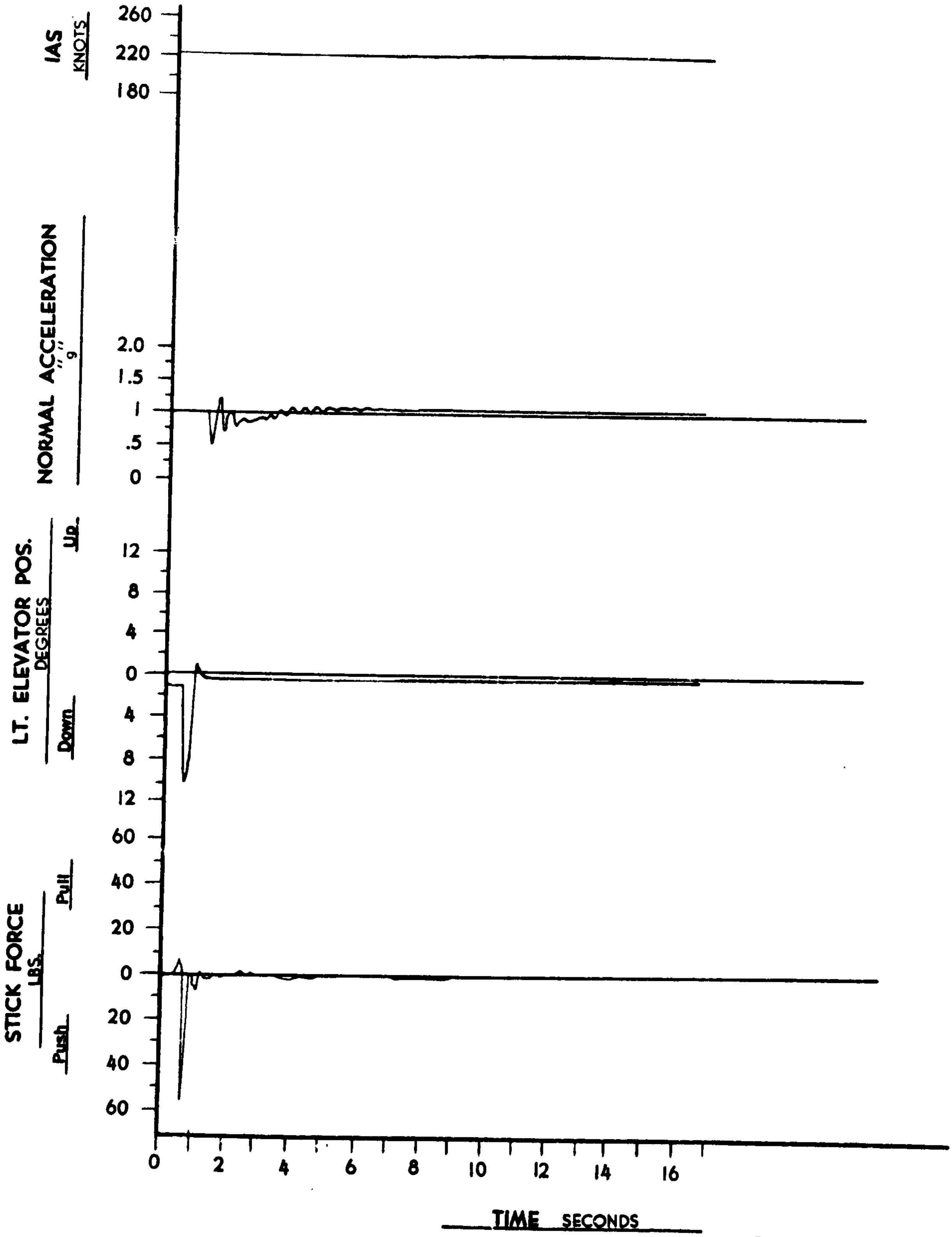


FIGURE NO. 313

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	303	KNOTS ;	ALTITUDE	29,700	FEET
C.G.	19.4	% MAC;	WEIGHT	251,000	LBS.
AVG. N2	8480	RPM;	STABILIZER POSITION	0.8	DEG. L. E. UP

NO EXTERNAL TANKS INSTALLED

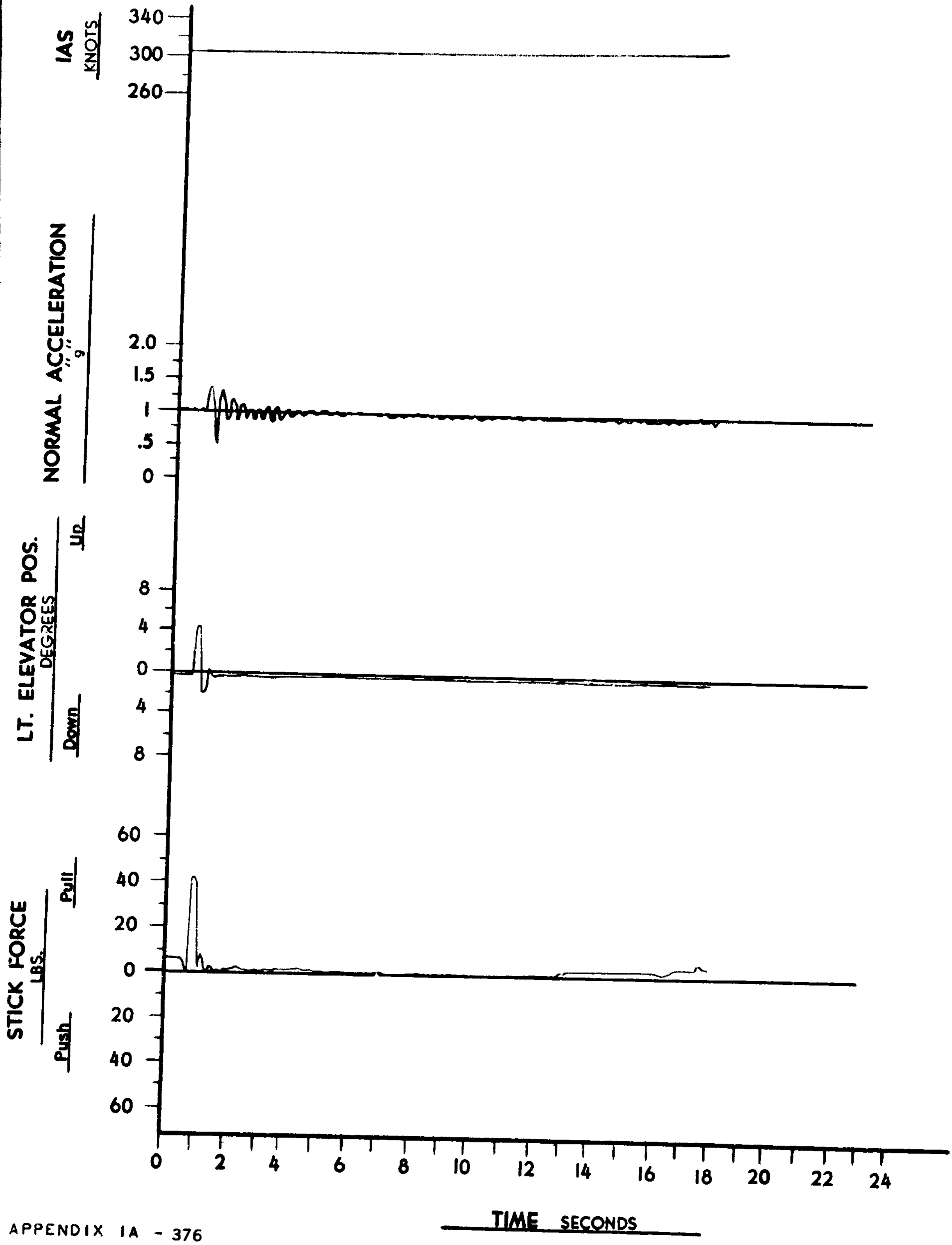


FIGURE NO. 314

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	303	KNOTS ;	ALTITUDE	29,700	FEET
C.G.	19.4	% MAC;	WEIGHT	251,000	LBS.
AVG. N2	8480	RPM;	STABILIZER POSITION	0.8 DEG. L. E. UP	

NO EXTERNAL TANKS INSTALLED

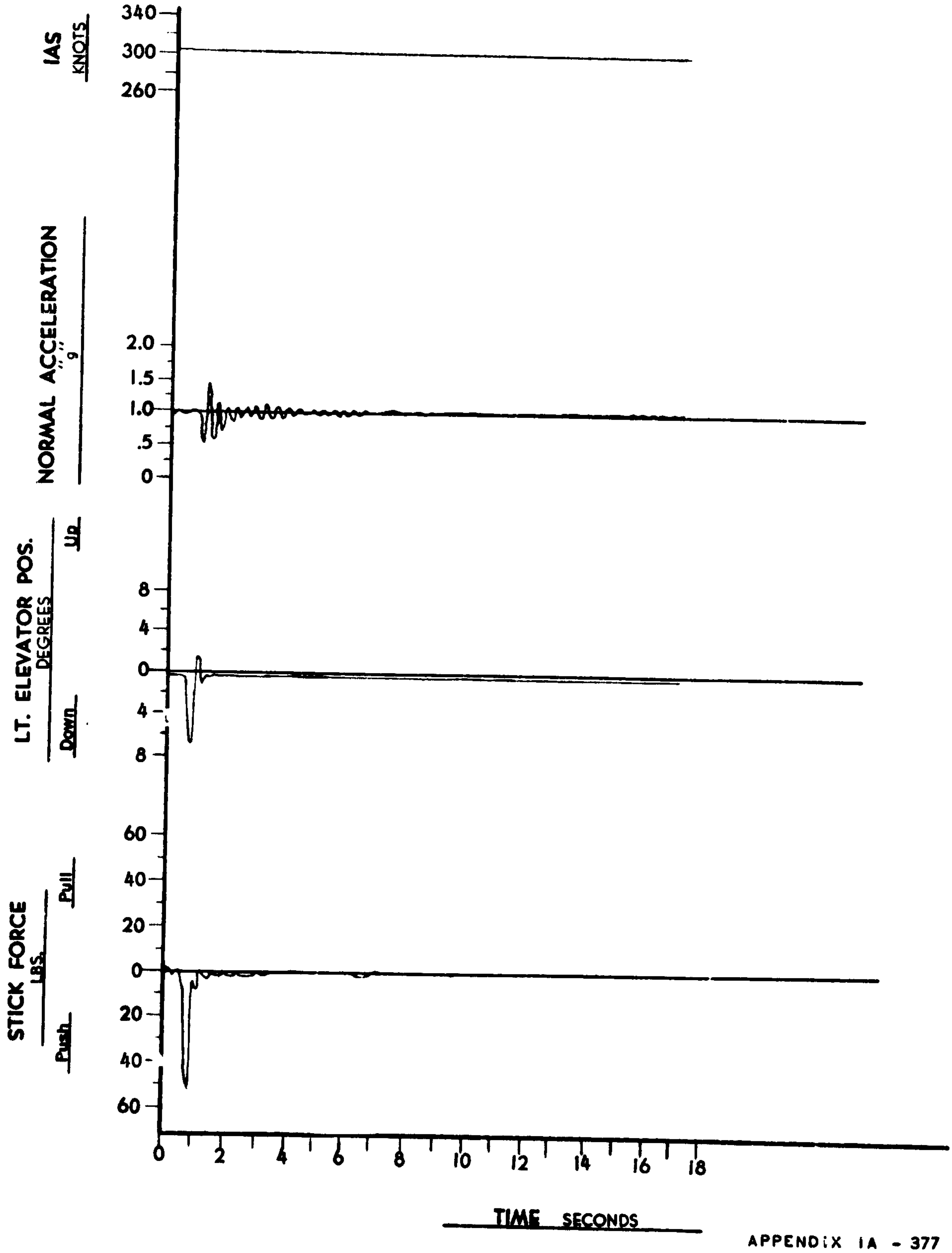


FIGURE NO. 315

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 304 KNOTS; ALTITUDE 29,900 FEET
C.G. 35.7 % MAC; WEIGHT 257,000 LBS.
AVG. N2 8590 RPM; STABILIZER POSITION 2.4 DEG. L. E. UP

NO EXTERNAL TANKS INSTALLED

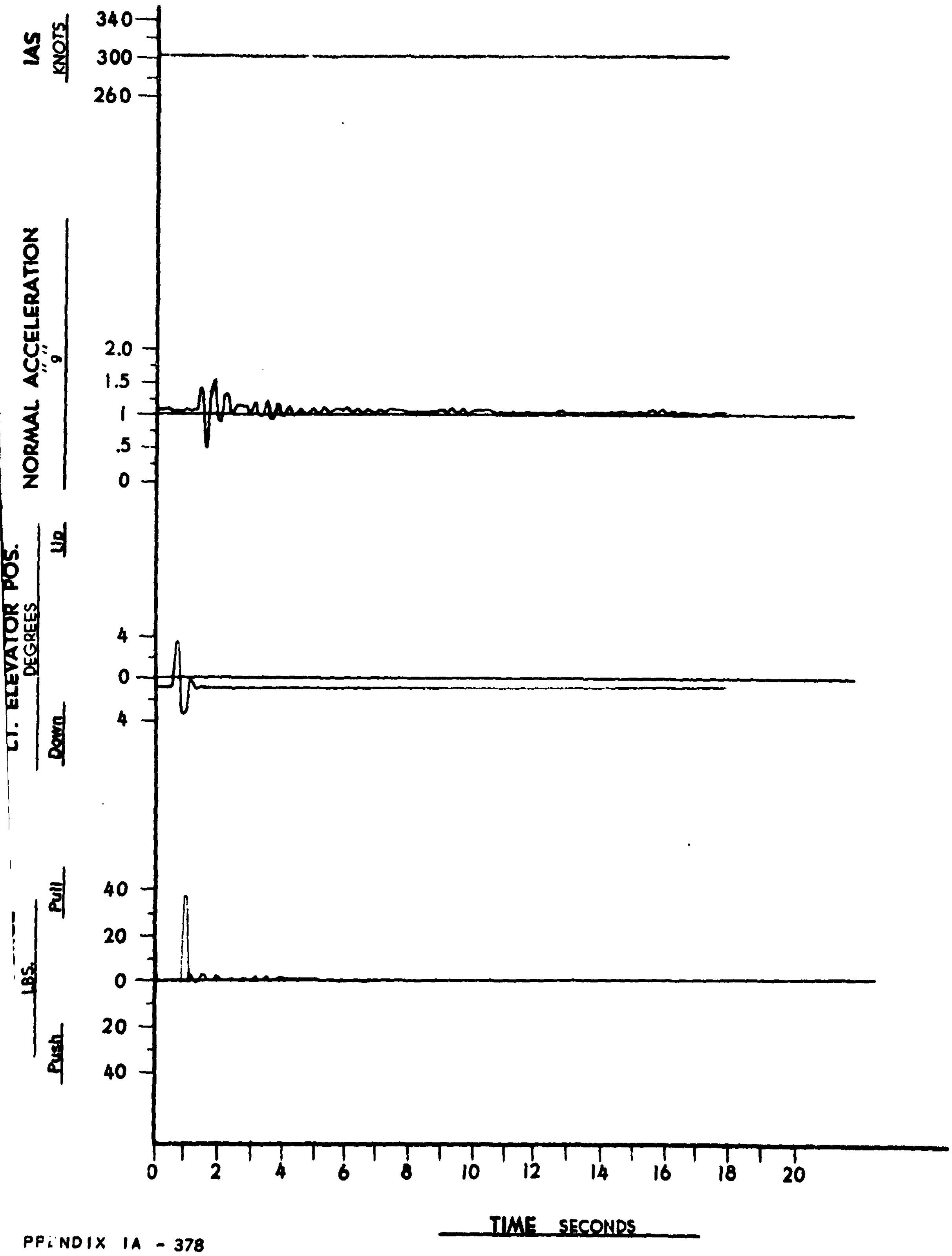


FIGURE NO. 316

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	304	KNOTS;	ALTITUDE	29,900	FEET
C.G.	35.7	% MAC;	WEIGHT	257,000	LBS.
AVG. N2	8590	RPM;	STABILIZER POSITION	2.4	DEG. L. E. UP

NO EXTERNAL TANKS INSTALLED

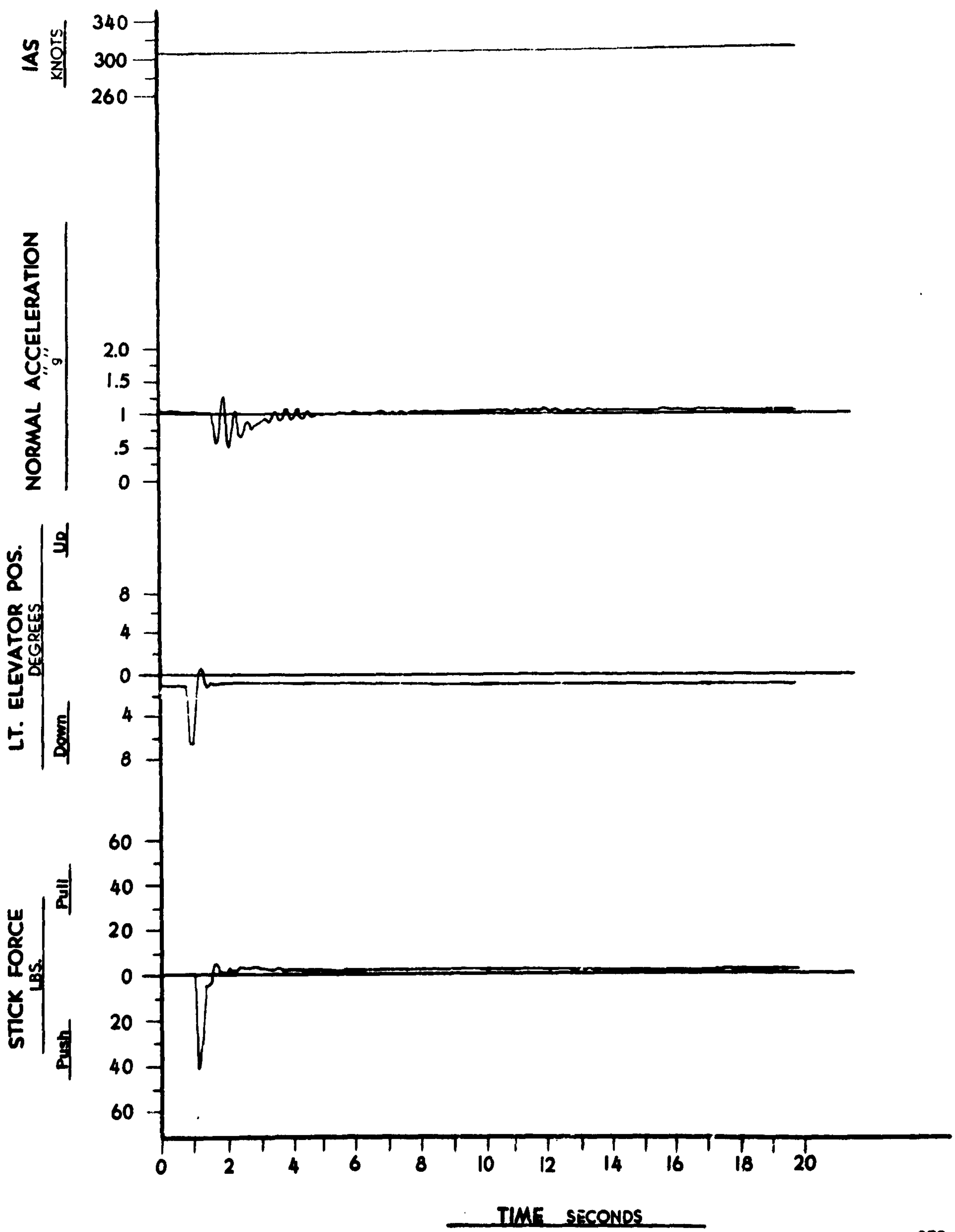


FIGURE NO. 317

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 299 KNOTS; ALTITUDE 30,600 FEET
C.G. 19.0 % MAC; WEIGHT 260,000 LBS.
AVG. N2 8560 RPM; STABILIZER POSITION 1.2 DEG. L. E. UP

EXTERNAL TANKS INSTALLED

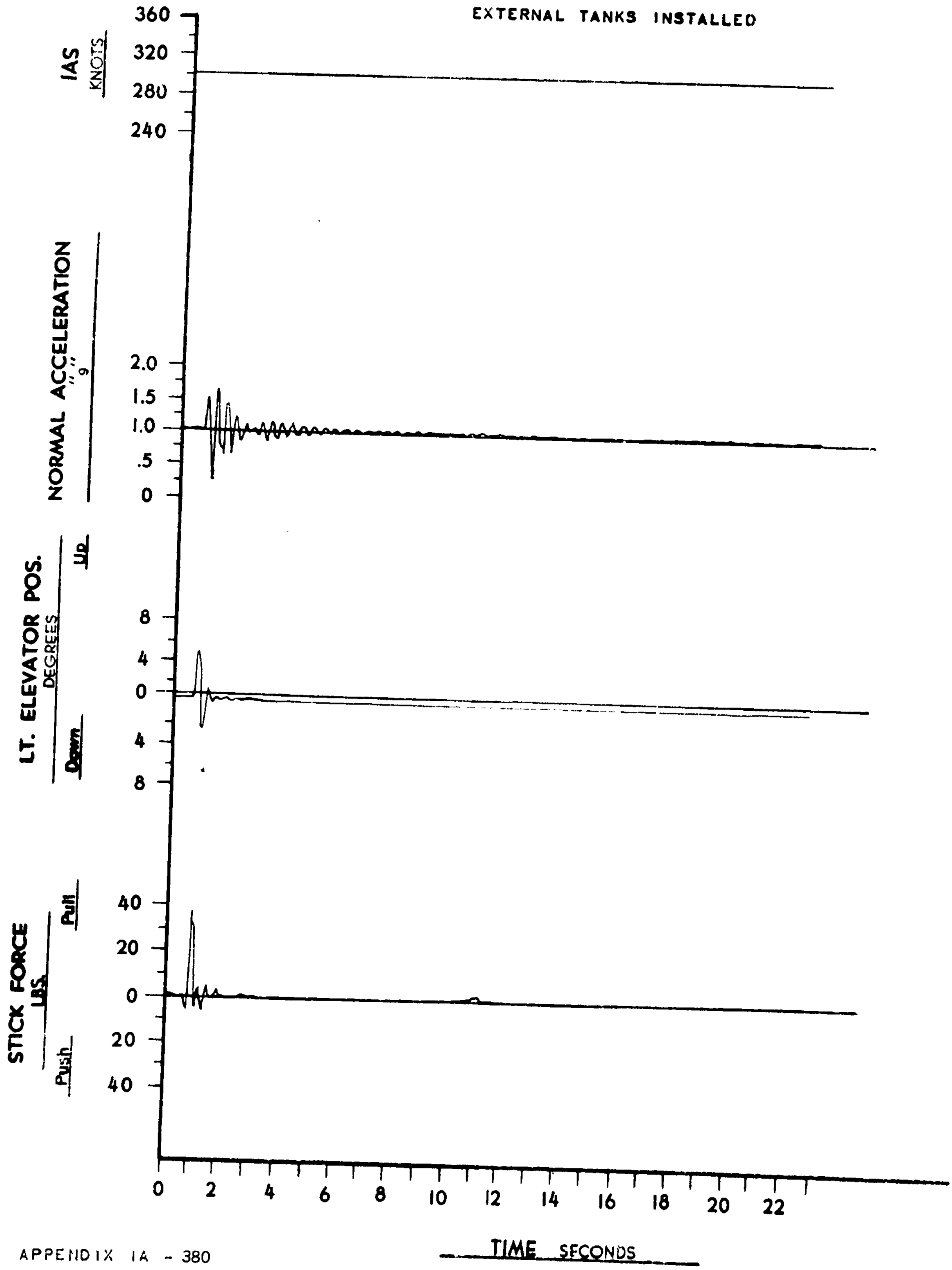


FIGURE NO. 318

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 299 KNOTS; ALTITUDE 30,600 FEET
C.G. 19.0 % MAC; WEIGHT 260,000 LBS.
AVG. N2 8560 RPM; STABILIZER POSITION 1.2 DEG. L. E. UP

EXTERNAL TANKS INSTALLED

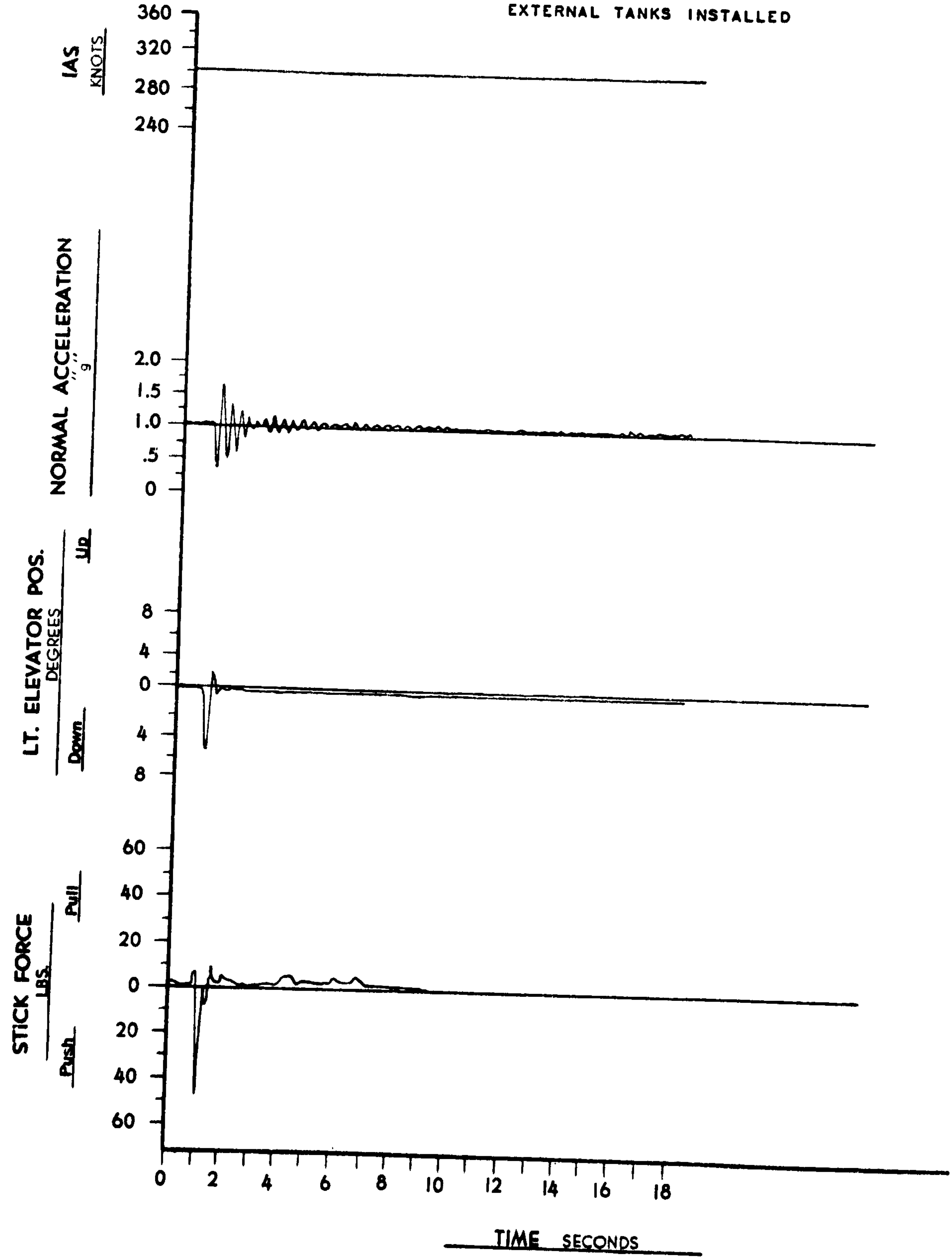


FIGURE NO. 319

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	299.5	KNOTS;	ALTITUDE	30,200	FEET
C.G.	32.2	% MAC;	WEIGHT	275000	LBS.
AVG. N2	8520	RPM;	STABILIZER	POSITION	2.4 DEG. L. E. UP

EXTERNAL TANKS INSTALLED

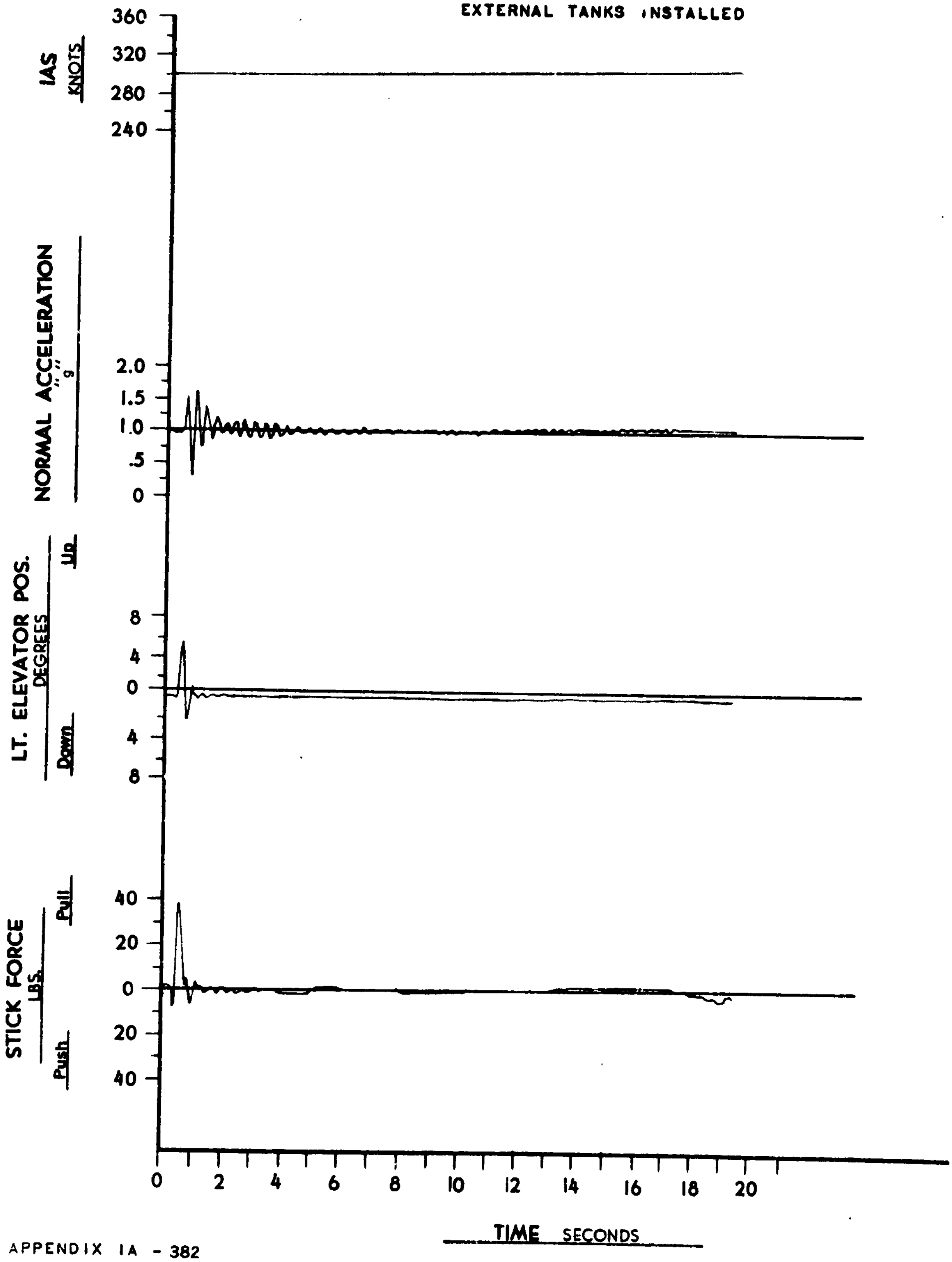


FIGURE NO. 320

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	299.5	KNOTS;	ALTITUDE	30,200	FEET
C.G.	32.2	% MAC;	WEIGHT	275000	LBS.
AVG. N2	8520	RPM;	STABILIZER POSITION	2.4 DEG. L. E. UP	

EXTERNAL TANKS INSTALLED

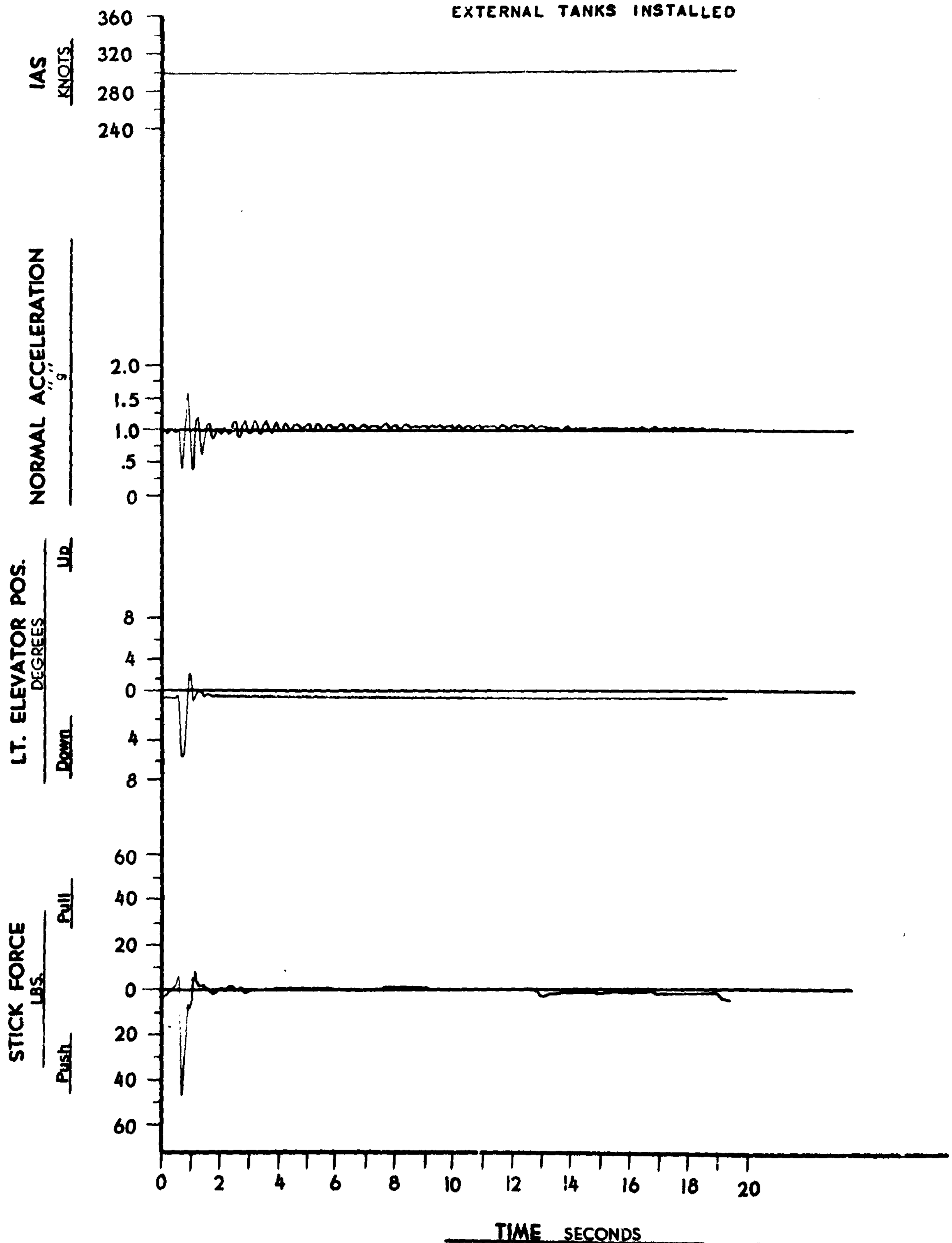


FIGURE NO. 321

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

POWER CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 340.5 KNOTS : ALTITUDE 30,000 FEET
C.G. 19.2 % MAC; WEIGHT 243,500 LBS.
AVG. N2 9180 RPM; STABILIZER POSITION 0.9 DEG. L. E. UP

NO EXTERNAL TANKS INSTALLED

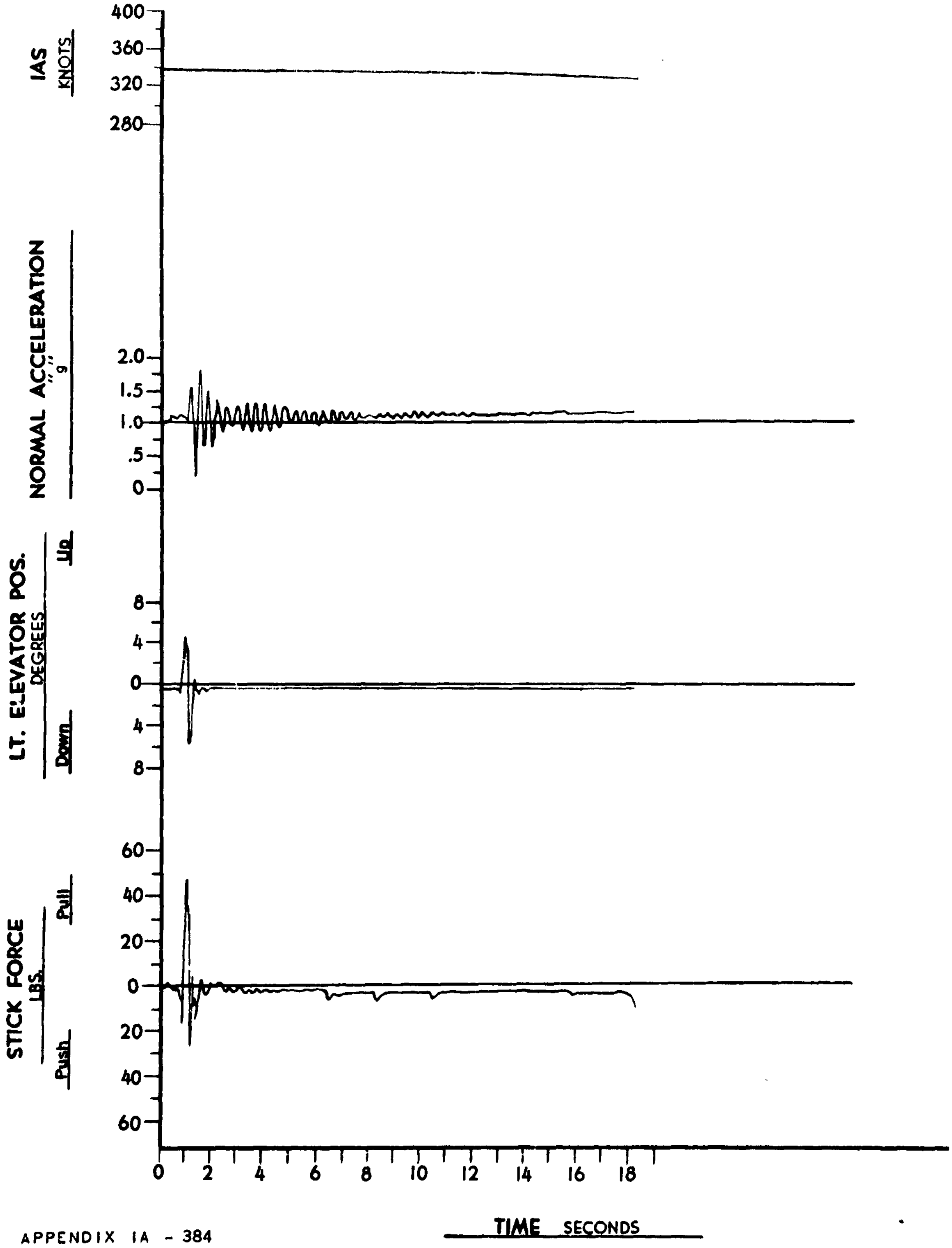


FIGURE NO. 322

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

POWER CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	340.5	KNOTS;	ALTITUDE	30,000	FEET
C.G.	19.2	% MAC;	WEIGHT	243,500	LBS.
AVG. N_2	9180	RPM;	STABILIZER POSITION	0.9	DEG. L. E. UP

NO EXTERNAL TANKS INSTALLED

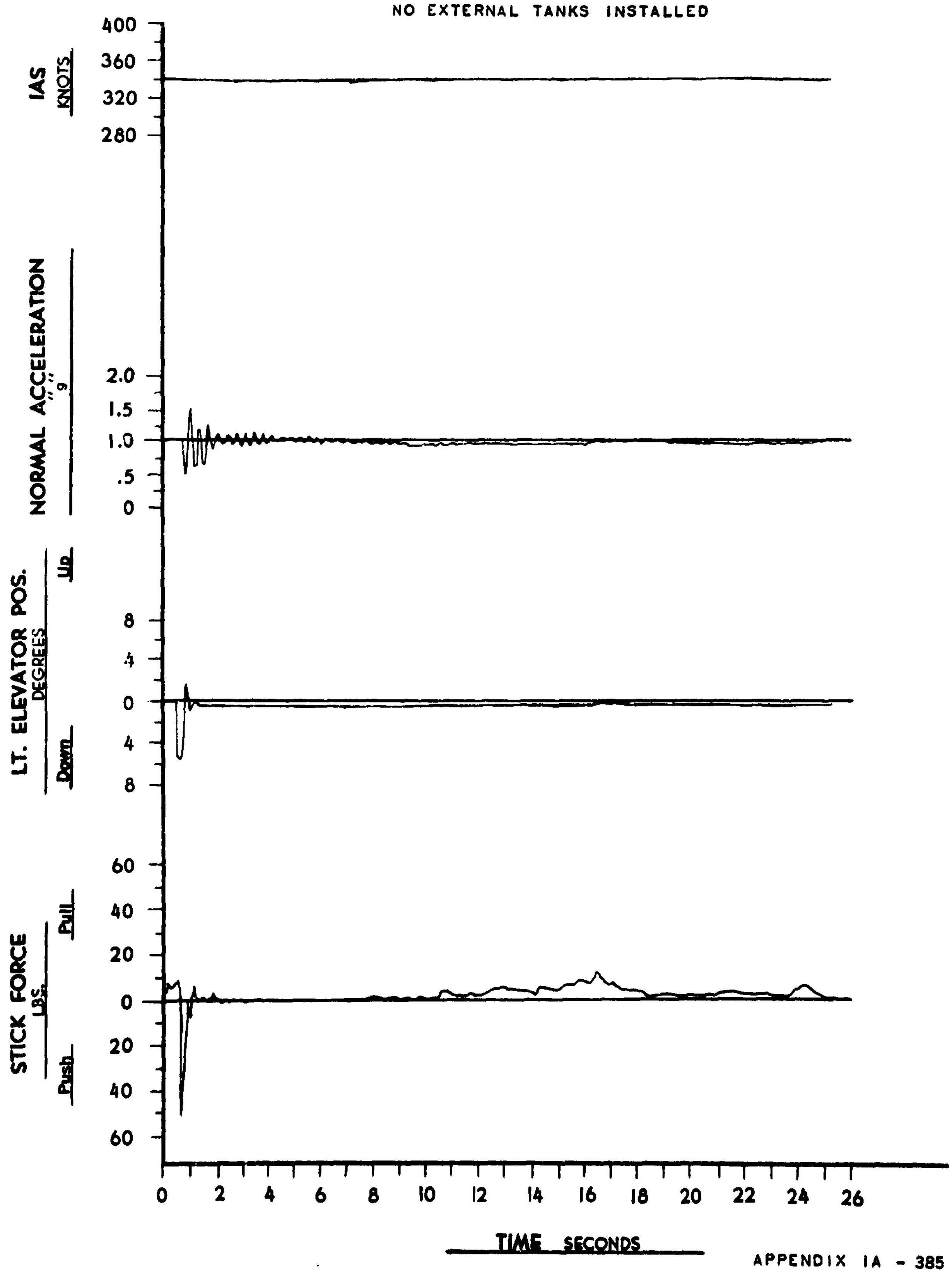


FIGURE NO. 323

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

POWER CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	341.5	KNOTS ;	ALTITUDE	29,900	FEET
C.G.	35.6	% MAC;	WEIGHT	255,000	LBS.
AVG. N2	9320	RPM;	STABILIZER POSITION	2.1 DEG. L. E. UP	

NO EXTERNAL TANKS INSTALLED

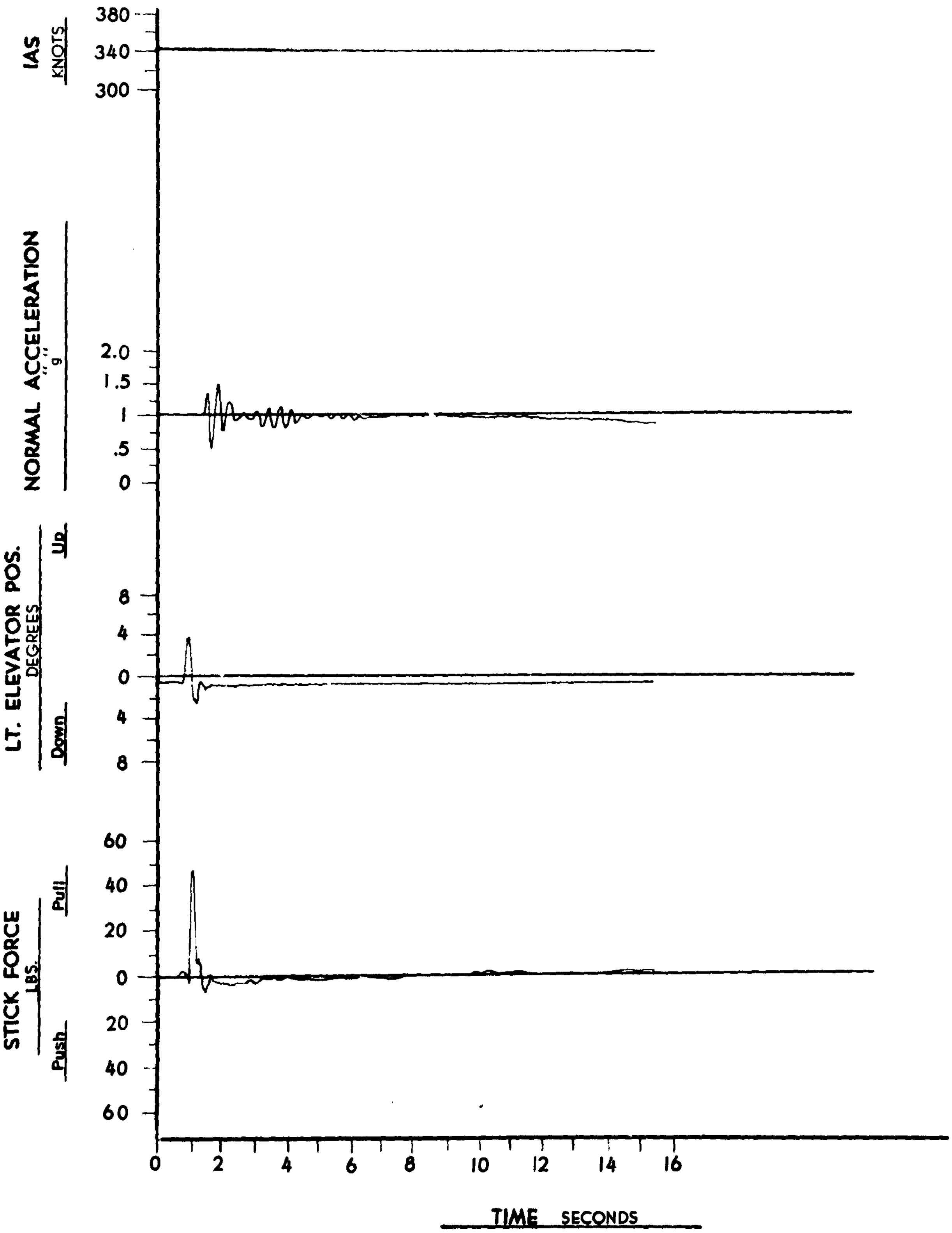


FIGURE NO. 324

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003
POWER CONFIGURATION ; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	341.5	KNOTS ;	ALTITUDE	29,900	FEET
C.G.	35.6	% MAC;	WEIGHT	255,000	LBS.
AVG. N2	9320	RPM;	STABILIZER POSITION	2.1 DEG. L. E. UP	

NO EXTERNAL TANKS INSTALLED

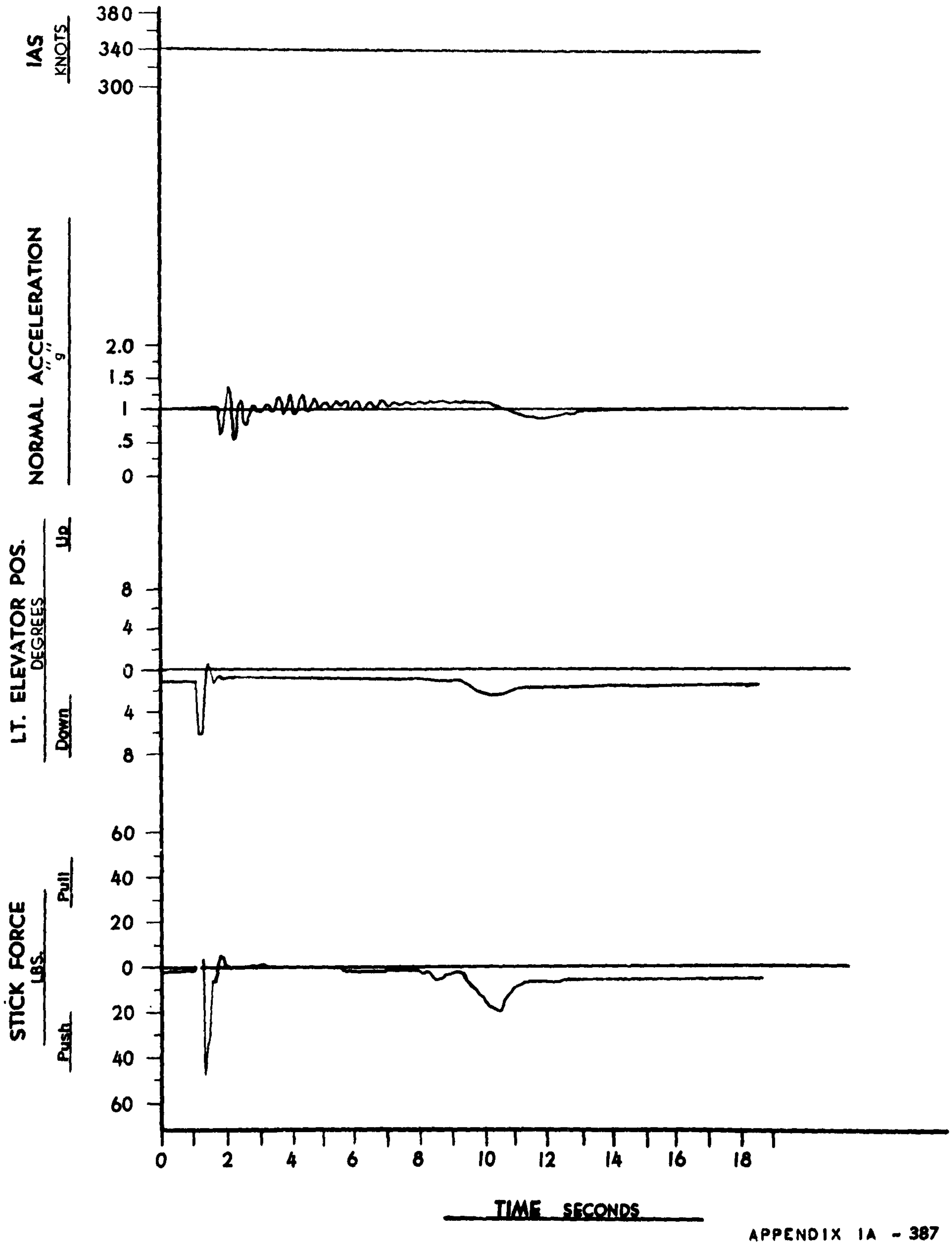


FIGURE NO.325

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	180.5	KNOTS;	ALTITUDE	46,800	FEET
C.G.	17.0	% MAC;	WEIGHT	253,600	LBS.
AVG. N_2	8810	RPM;	STABILIZER POSITION	2.9 DEG. L. E. DN.	

NO EXTERNAL TANKS INSTALLED

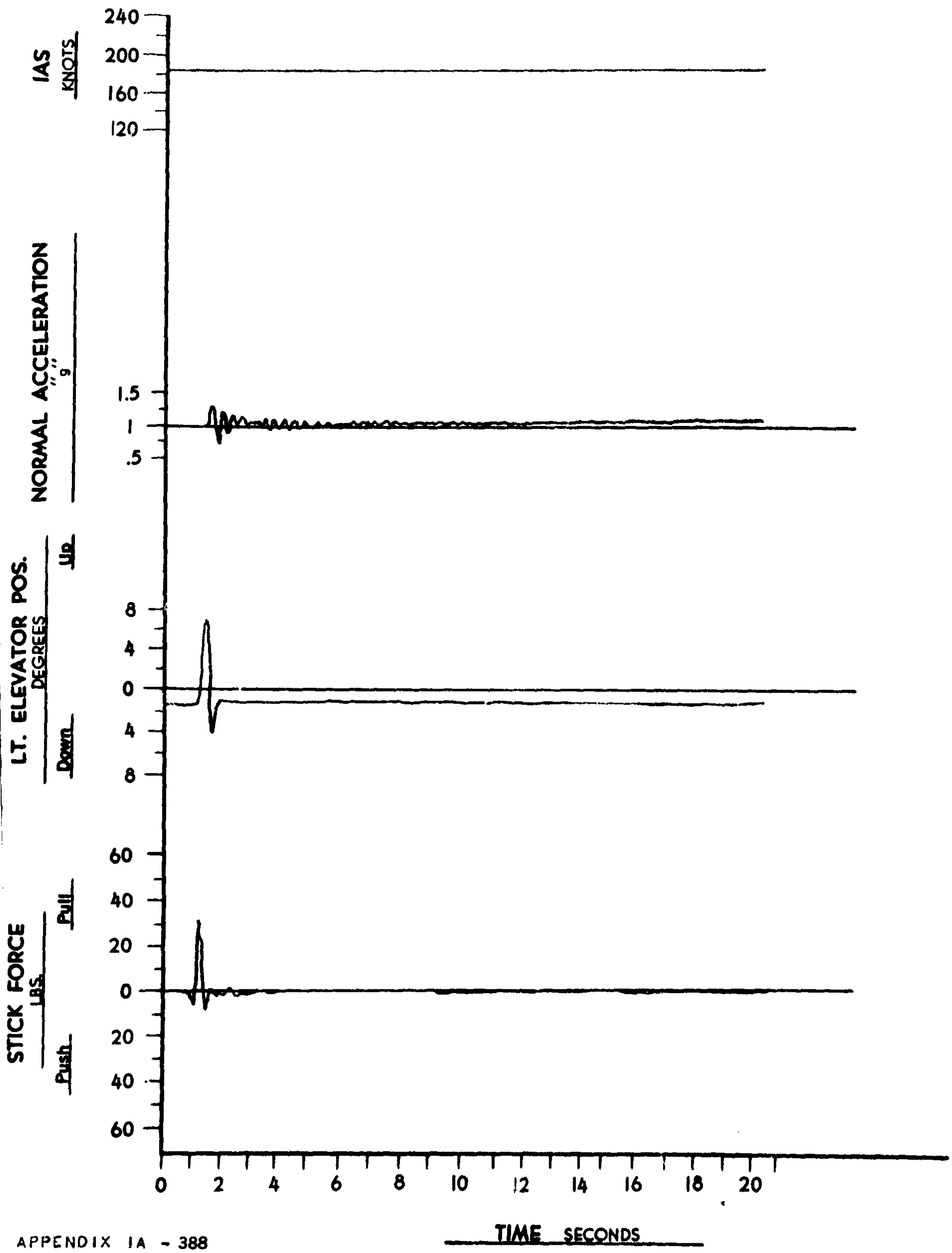


FIGURE NO. 326

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	180.5	KNOTS;	ALTITUDE	46,800	FEET
C.G.	17.0	% MAC;	WEIGHT	253,600	LBS.
AVG. N2	8810	RPM;	STABILIZER POSITION	2.9 DEG. L. E. DN.	

NO EXTERNAL TANKS INSTALLED

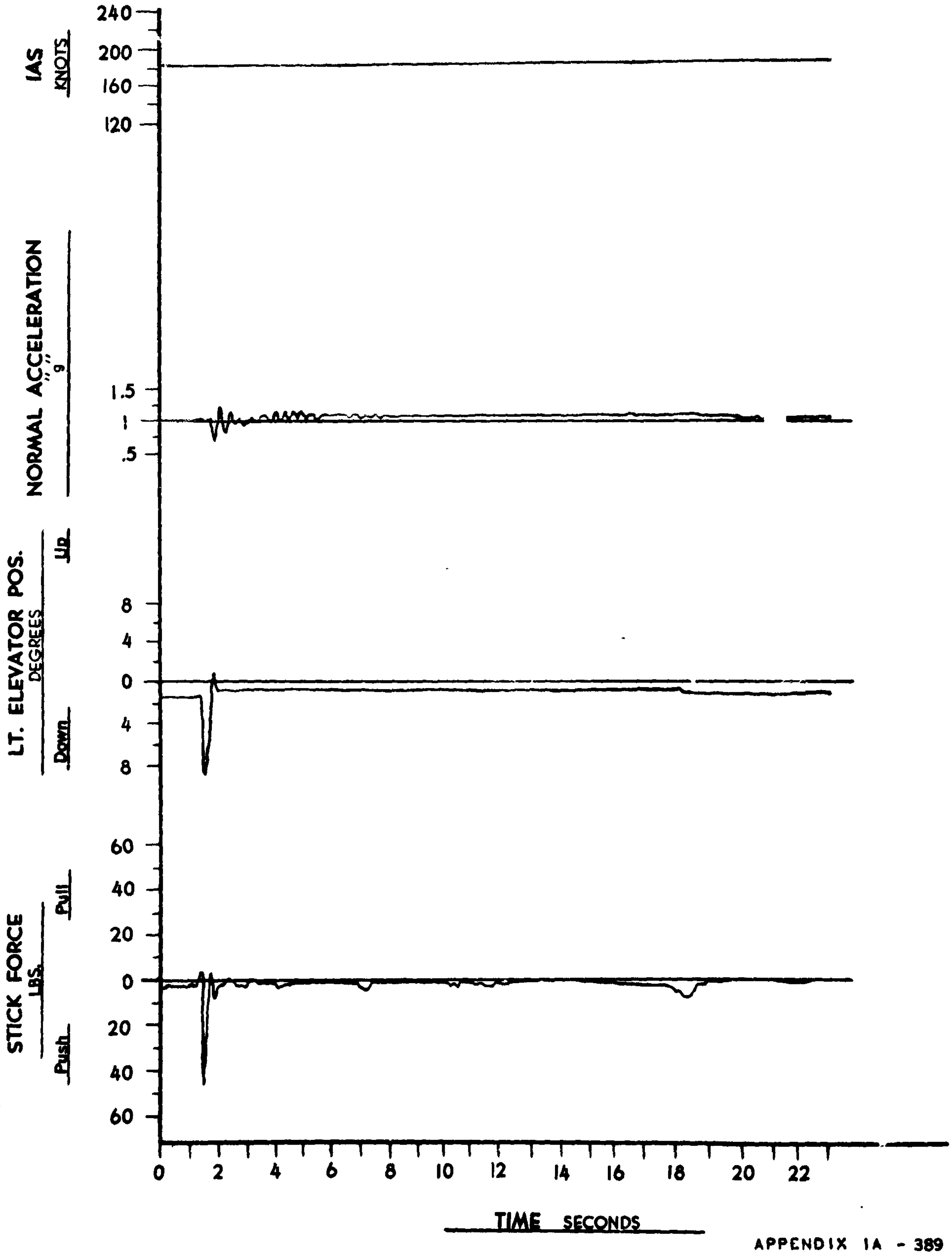


FIGURE NO. 327

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	173.0	KNOTS;	ALTITUDE	47,700	FEET
C.G.	34.0	% MAC;	WEIGHT	239,500	LBS.
AVG. N2	7530	RPM;	STABILIZER POSITION	0.1	DEG. L. E. UP

NO EXTERNAL TANKS INSTALLED

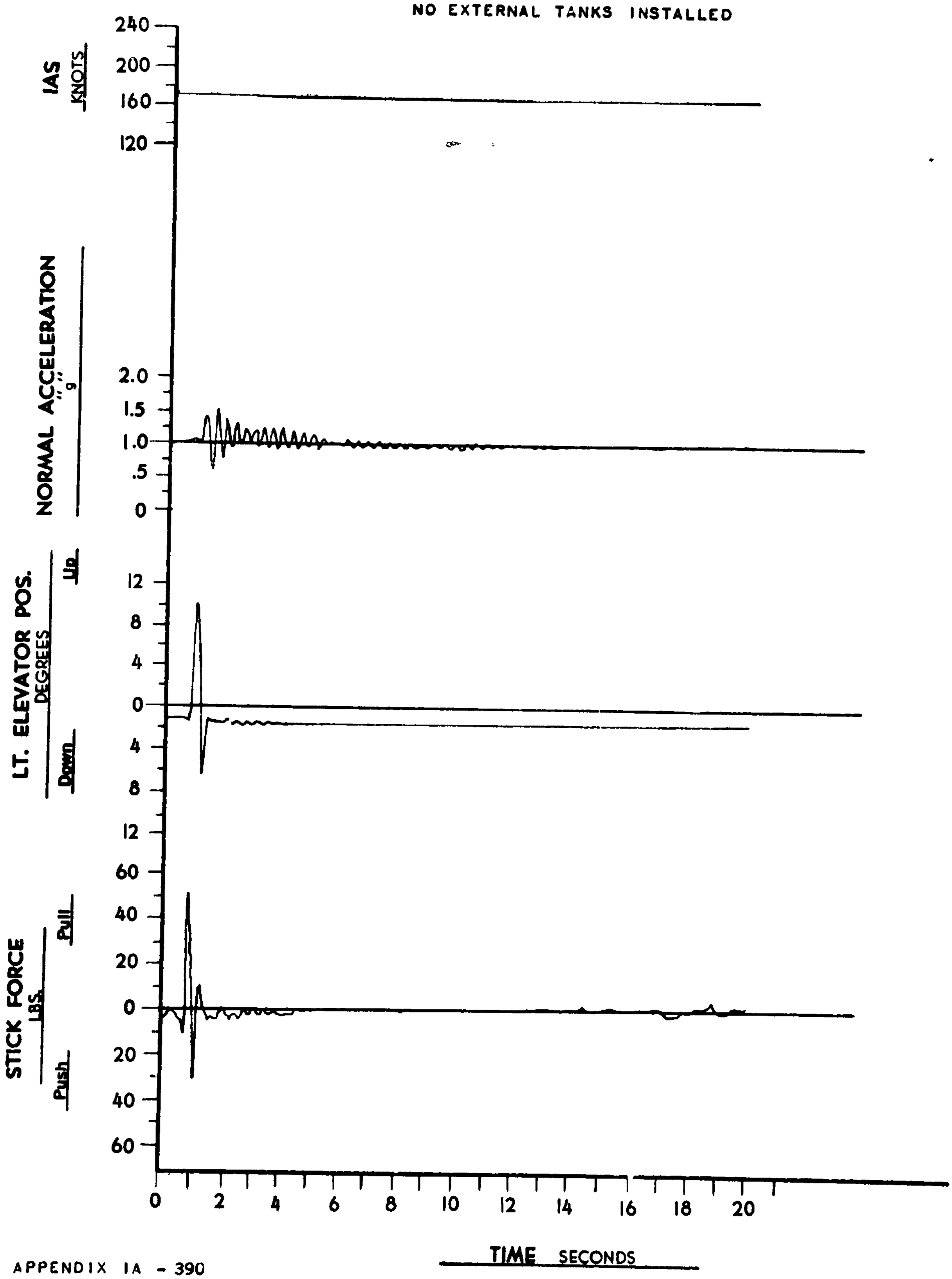


FIGURE NO. 328

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	173.0	KNOTS;	ALTITUDE	47,700	FEET
C.G.	34.0	% MAC;	WEIGHT	239,500	LBS.
AVG. N2	7530	RPM;	STABILIZER POSITION	0.1	DEG. L. E. UP

NO EXTERNAL TANKS INSTALLED

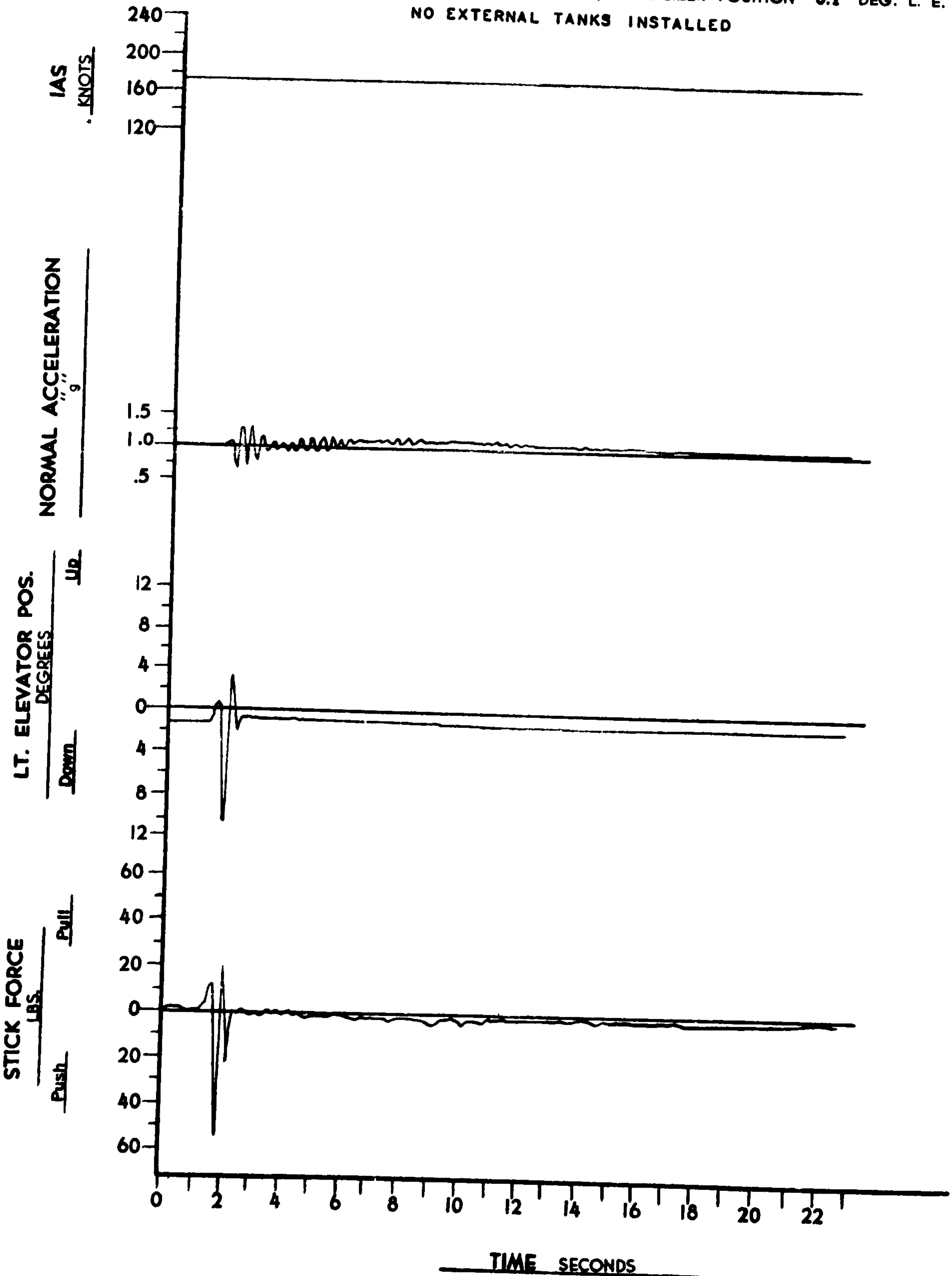


FIGURE NO. 329

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 207.5 KNOTS; ALTITUDE 46,800 FEET
C.G. 18.3 % MAC; WEIGHT 256,000 LBS.
AVG. N_2 8920 RPM; STABILIZER POSITION 1.2 DEG. L. E. DN.

NO EXTERNAL TANKS INSTALLED

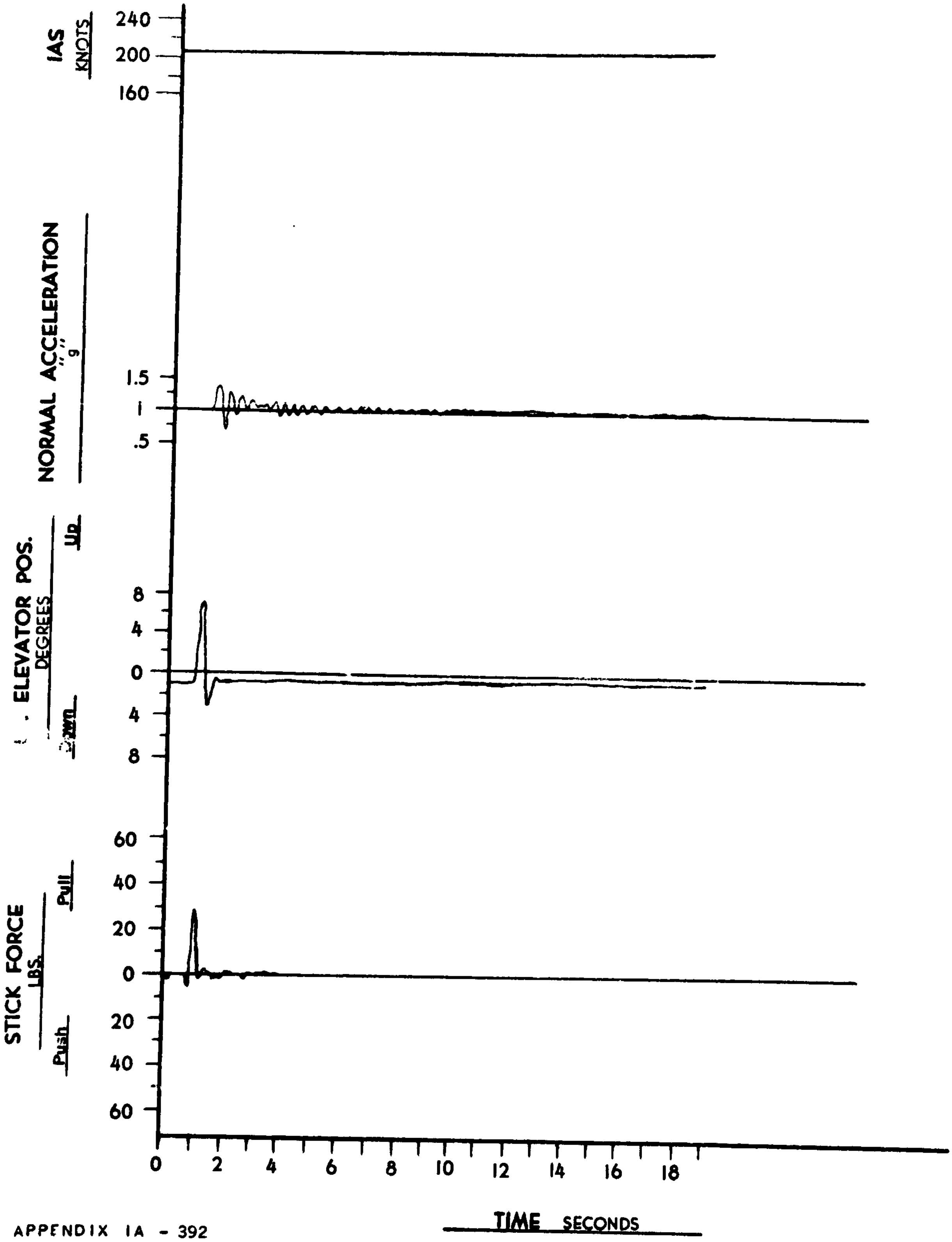


FIGURE NO. 330

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	207.5	KNOTS;	ALTITUDE	46,800	FEET
C.G.	18.3	% MAC;	WEIGHT	256,000	LBS.
AVG. N2	8920	RPM;	STABILIZER POSITION	1.2	DEG. L. E. DN.

NO EXTERNAL TANKS INSTALLED

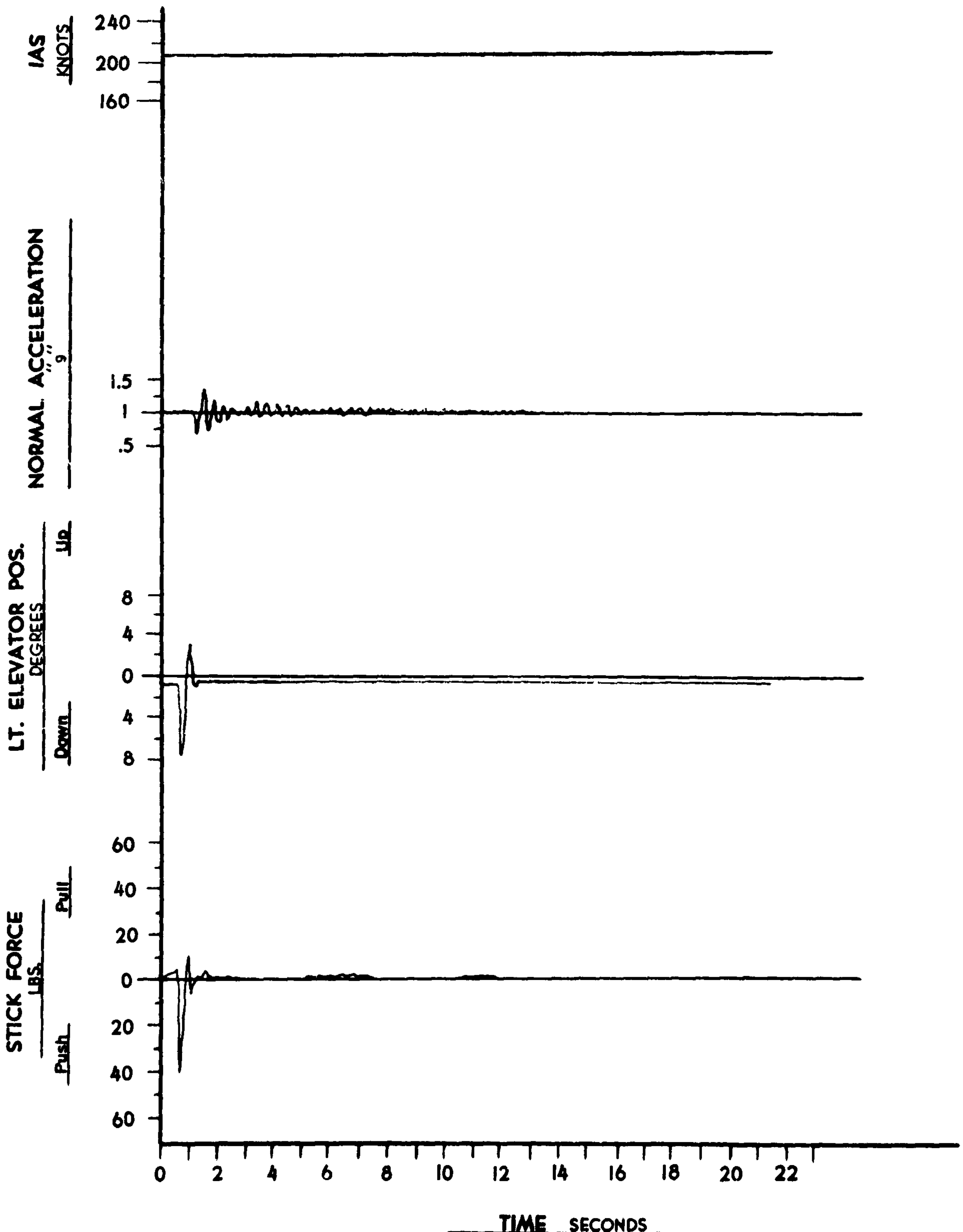


FIGURE NO. 331

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	200.5	KNOTS;	ALTITUDE	48,000	FEET
C.G.	33.9	% MAC;	WEIGHT	240,500	LBS.
AVG. N_2	8610	RPM;	STABILIZER POSITION	0.8	DEG. L. E. UP

NO EXTERNAL TANKS INSTALLED

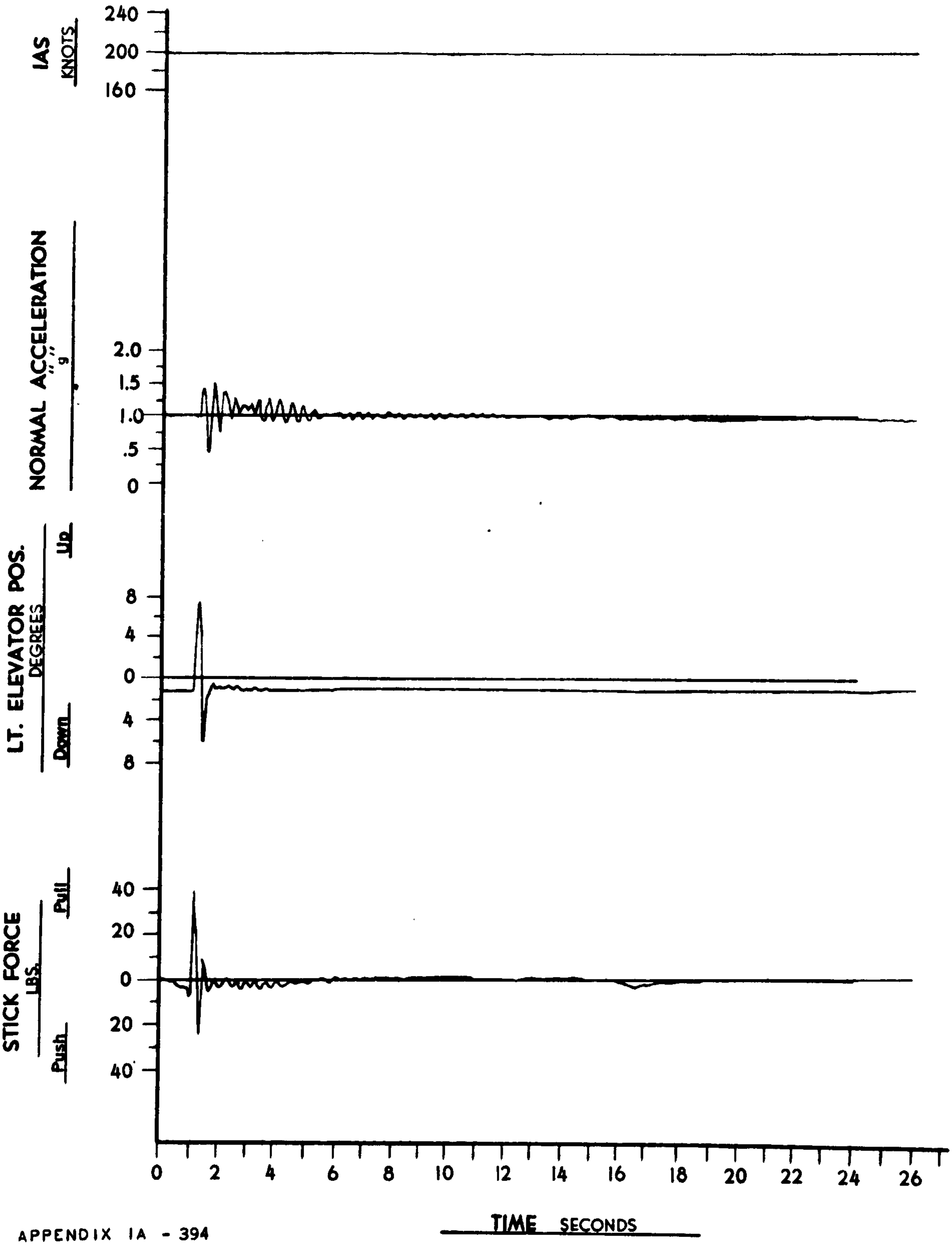


FIGURE NO. 332

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	200.5	KNOTS;	ALTITUDE	48,000	FEET
C.G.	33.9	% MAC;	WEIGHT	240,500	LBS.
AVG. N_2	8600	RPM;	STABILIZER POSITION	0.8 DEG. L. E. UP	

NO EXTERNAL TANKS INSTALLED

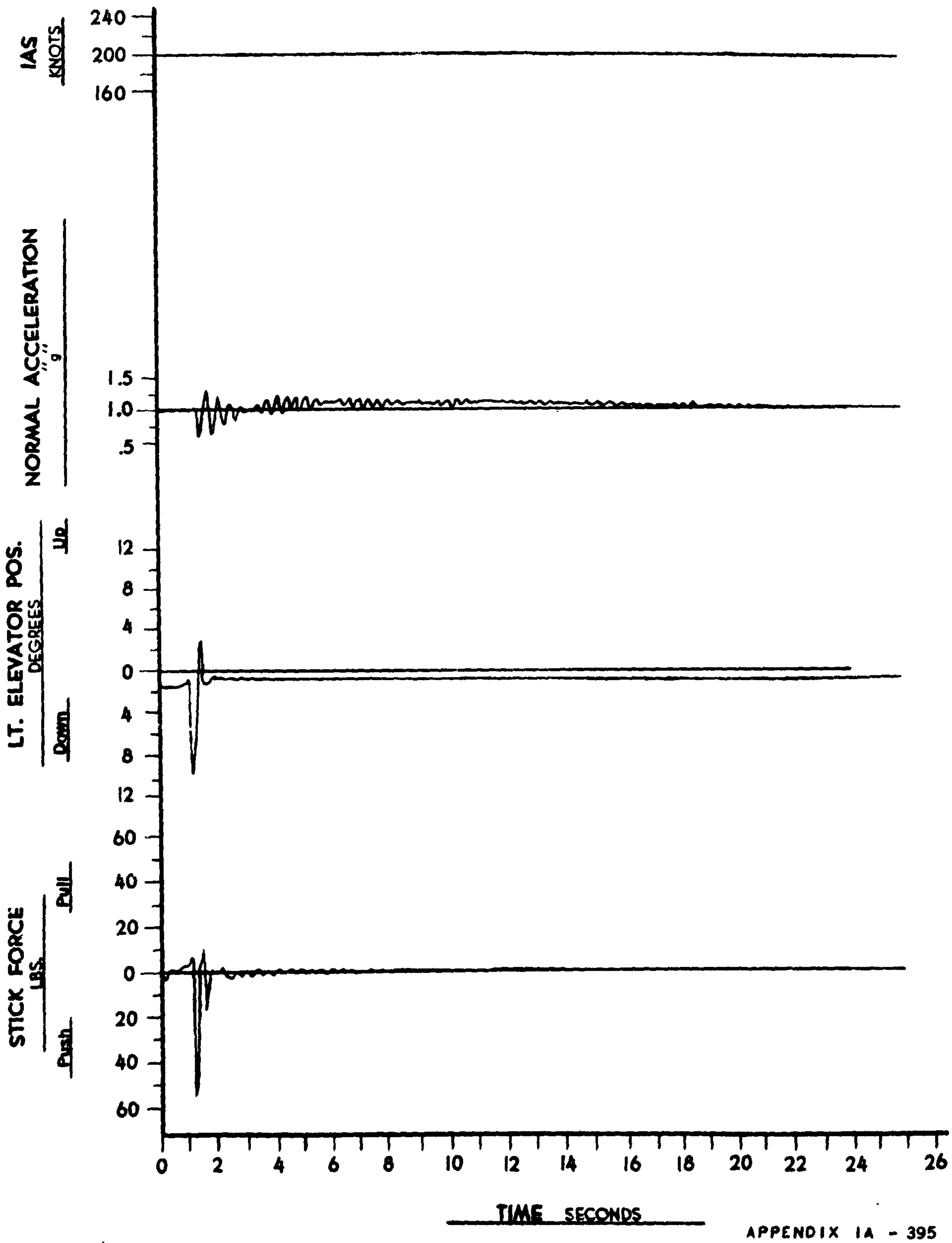


FIGURE NO. 333

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

POWER CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	220.5	KNOTS;	ALTITUDE	46,700	FEET
C.G.	19.1	% MAC;	WEIGHT	258,500	LBS.
AVG. N2	9170	RPM;	STABILIZER POSITION	.5	DEG. L. E. DN.

NO EXTERNAL TANKS INSTALLED

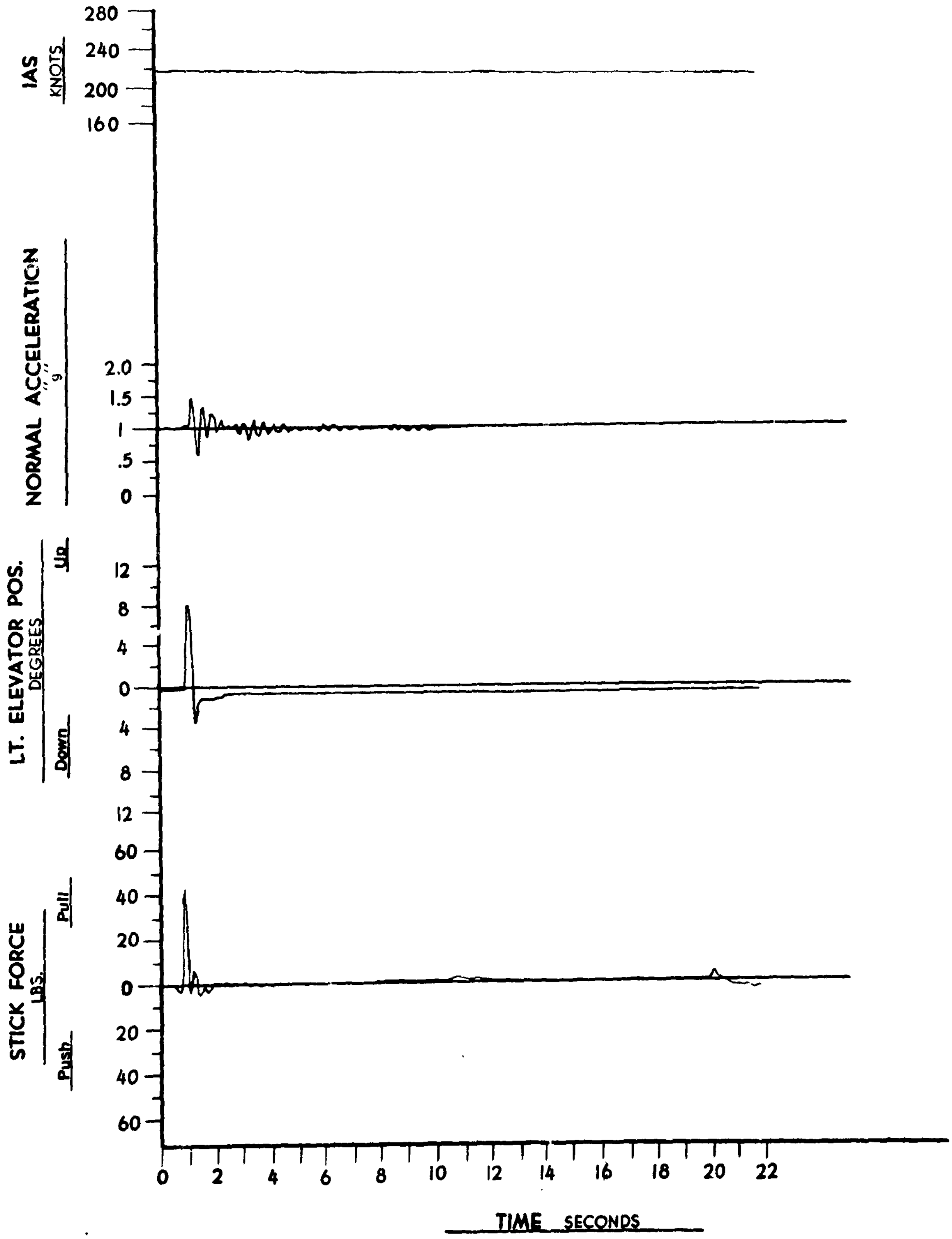


FIGURE NO. 334

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

POWER CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	220.5	KNOTS ;	ALTITUDE	46,700	FEET
C.G.	19.1	% MAC;	WEIGHT	258,500	LBS.
AVG. N2	9170	RPM;	STABILIZER POSITION	.5	DEG. L. E. DN.

NO EXTERNAL TANKS INSTALLED

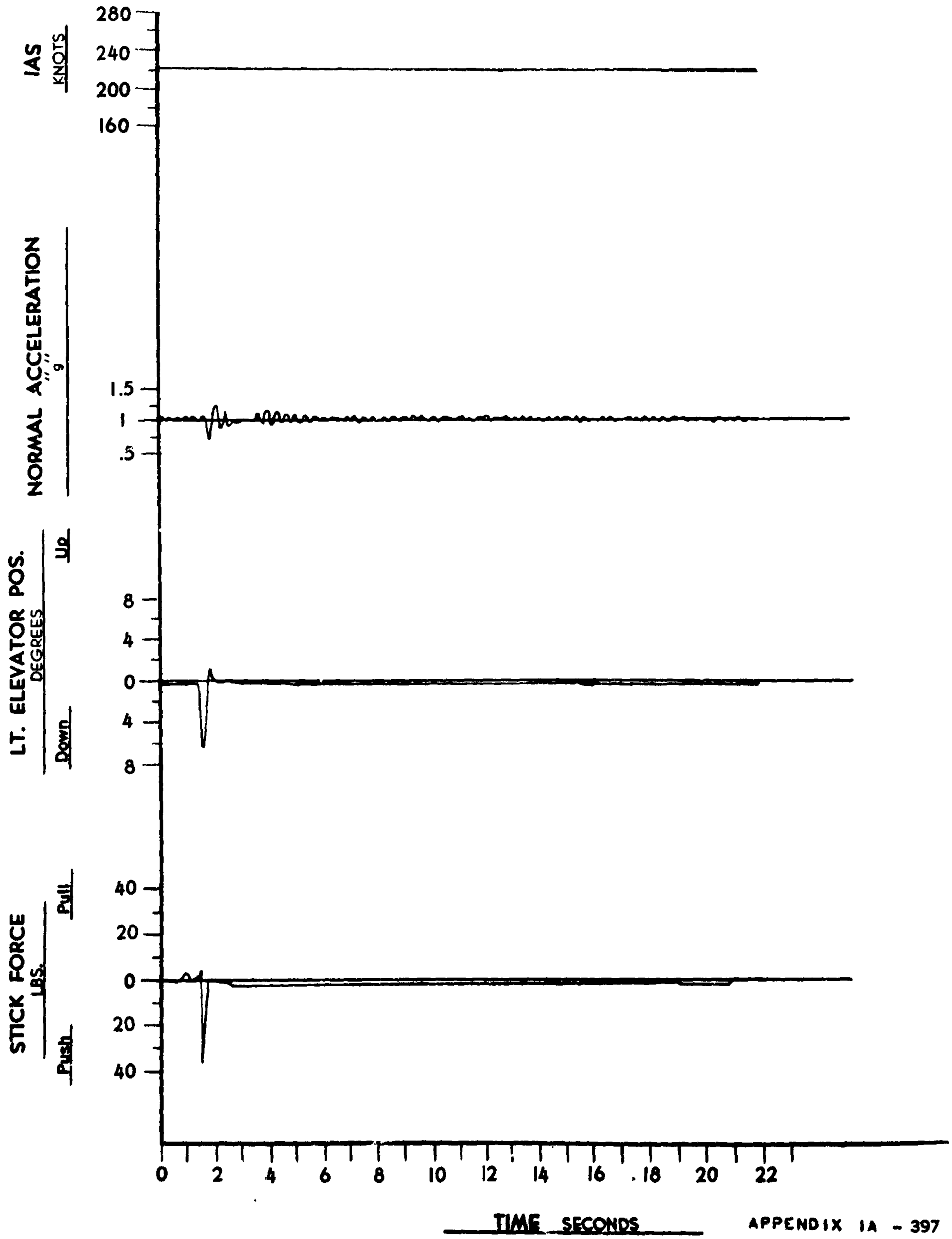


FIGURE NO. 335

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

POWER CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 217.5 KNOTS : ALTITUDE 48,000 FEET
C.G. 33.7 % MAC; WEIGHT 241,500 LBS.
AVG. N2 9100 RPM; STABILIZER POSITION 1.2 DEG. L. E. UP

NO EXTERNAL TANKS INSTALLED

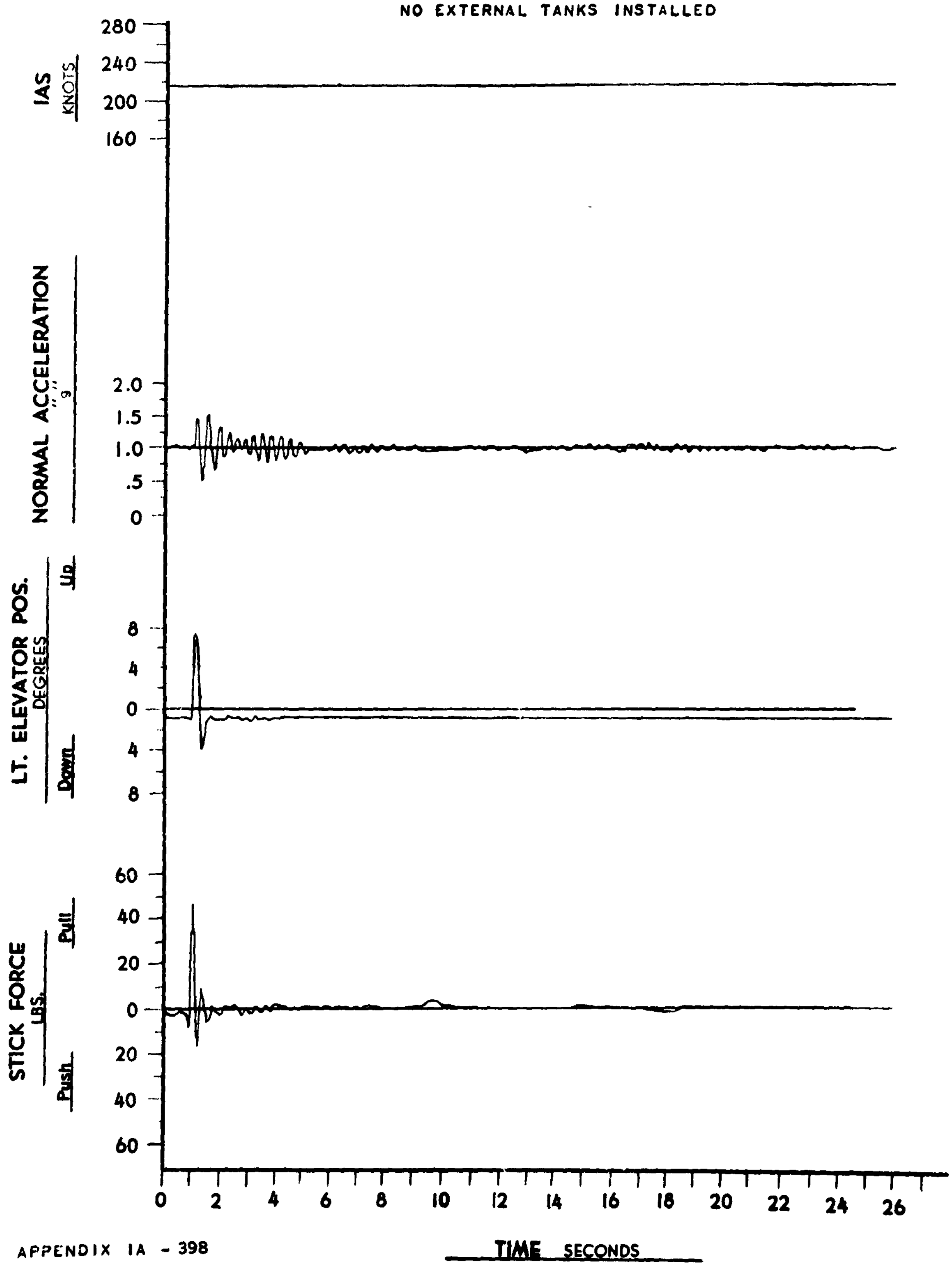


FIGURE NO. 336

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

POWER CONFIGURATION ; CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 217.5 KNOTS ; ALTITUDE 48,000 FEET
C.G. 33.7 % MAC; WEIGHT 241,500 LBS.
AVG. N_2 9100 RPM; STABILIZER POSITION 1.2 DEG. L. E. UP

NO EXTERNAL TANKS INSTALLED

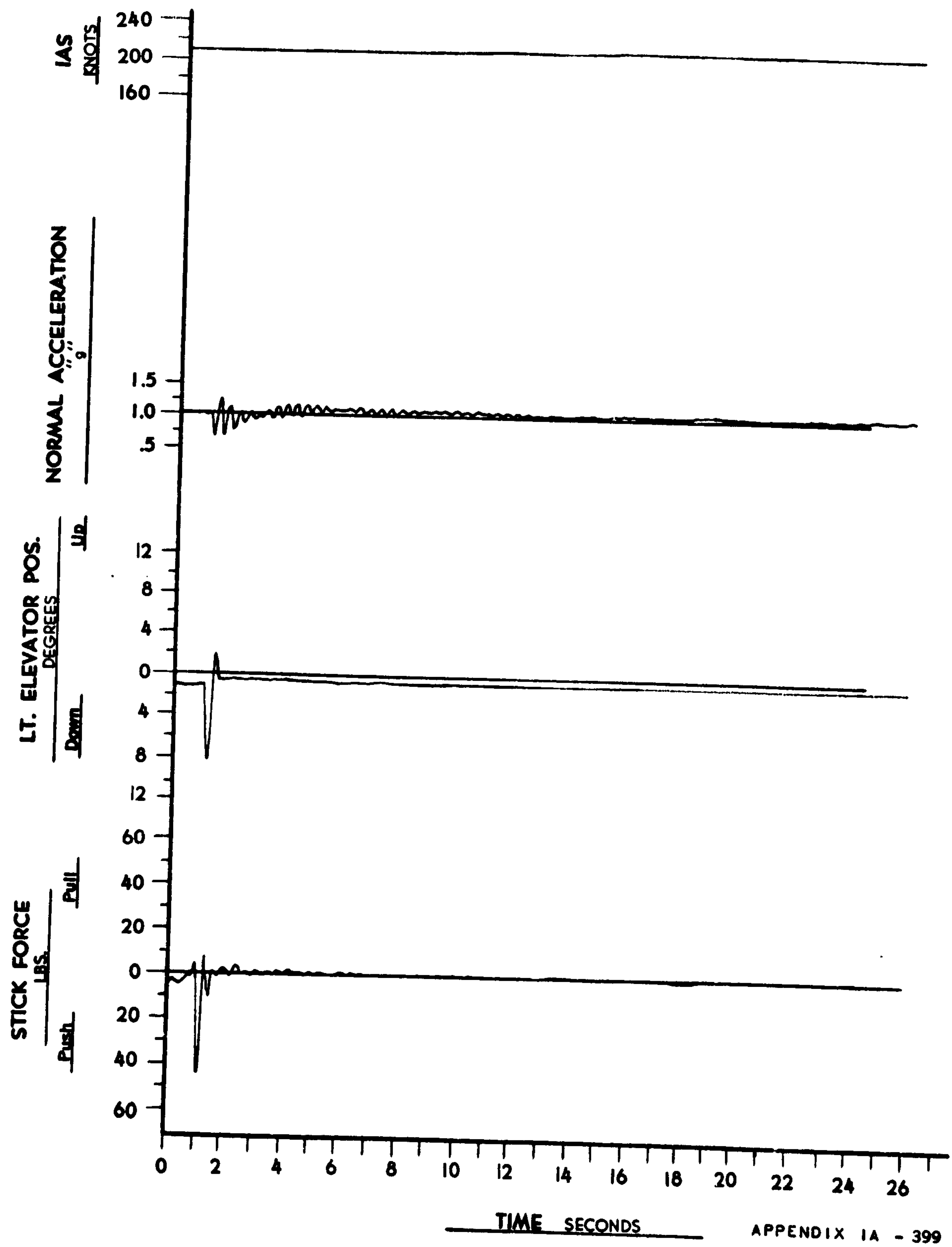


FIGURE NO. 337

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	203	KNOTS;	ALTITUDE	47,800	FEET
C.G.	18.4	% MAC;	WEIGHT	253,000	LBS.
AVG. N2	8950	RPM;	STABILIZER POSITION	1.0	DEG. L. E. DN.

EXTERNAL TANKS INSTALLED

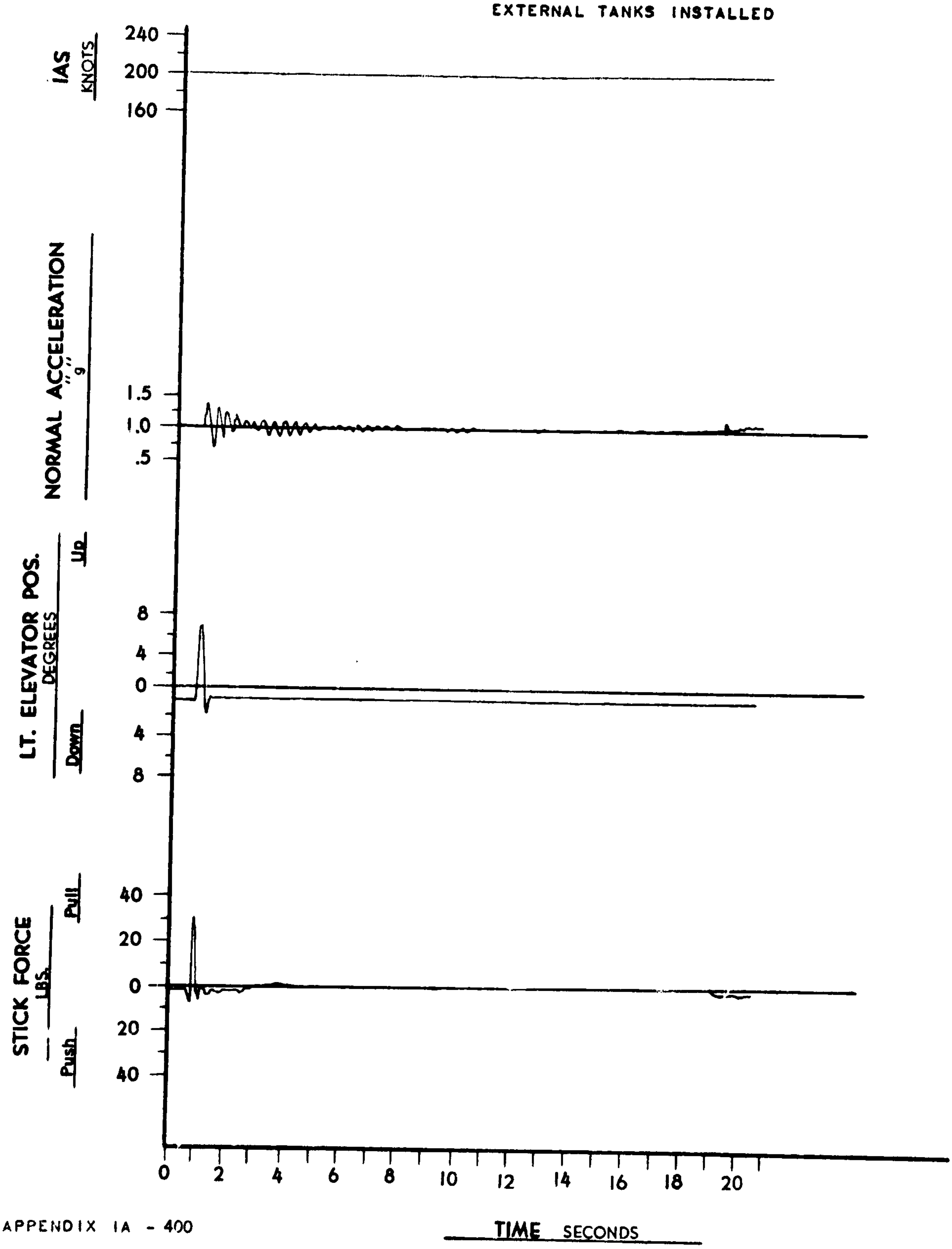


FIGURE NO. 338

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	203	KNOTS;	ALTITUDE	47,900	FEET
C.G.	18.4	% MAC;	WEIGHT	253,000	LBS.
AVG. N2	8950	RPM;	STABILIZER POSITION	1.0	DEG. L. E. DN.

EXTERNAL TANKS INSTALLED

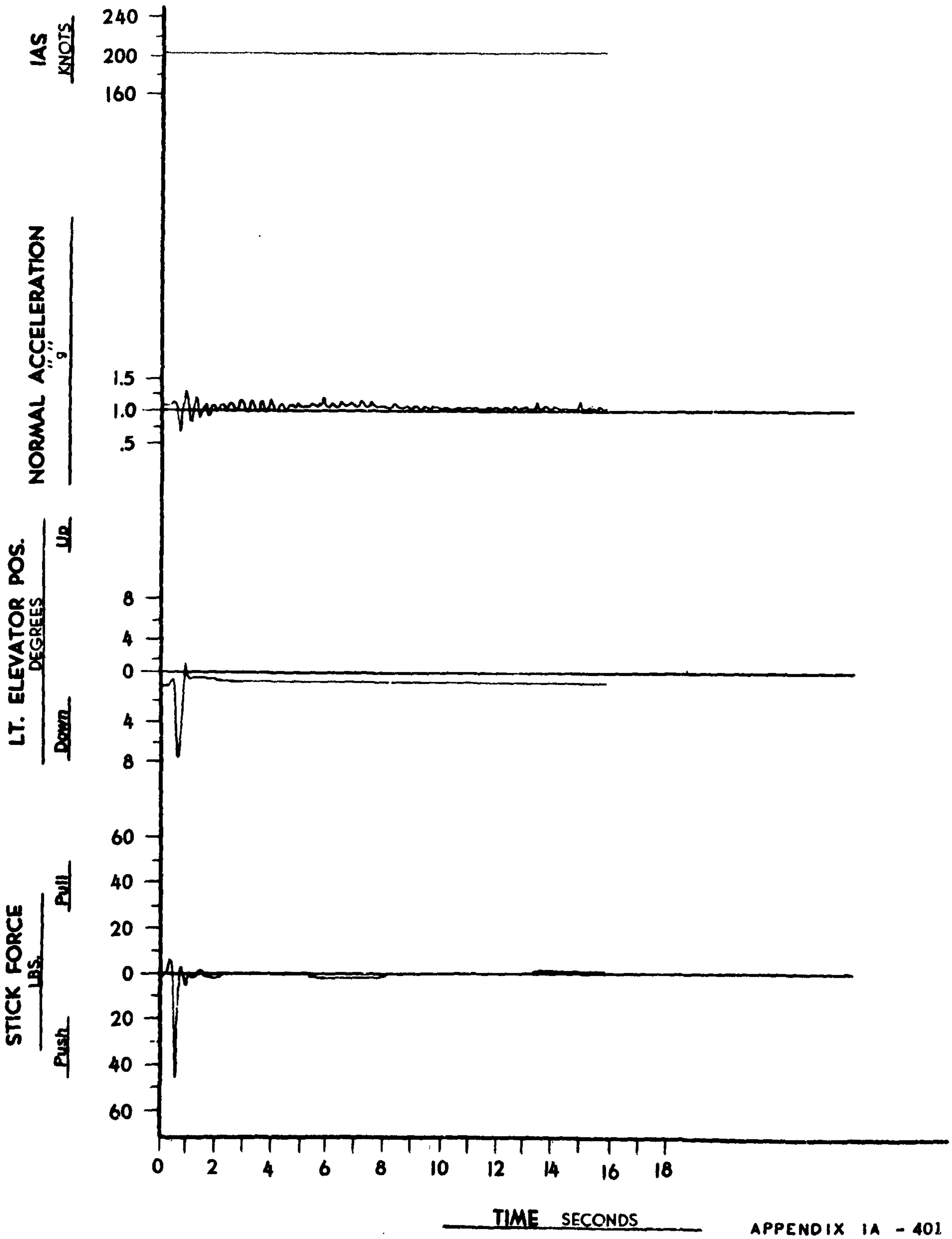


FIGURE NO. 339

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	201.5	KNOTS:	ALTITUDE	48,100	FEET
C.G.	33.5	% MAC;	WEIGHT	265,500	LBS.
AVG. N2	9130	RPM;	STABILIZER POSITION	1.5	DEG. L. E. UP

EXTERNAL TANKS INSTALLED

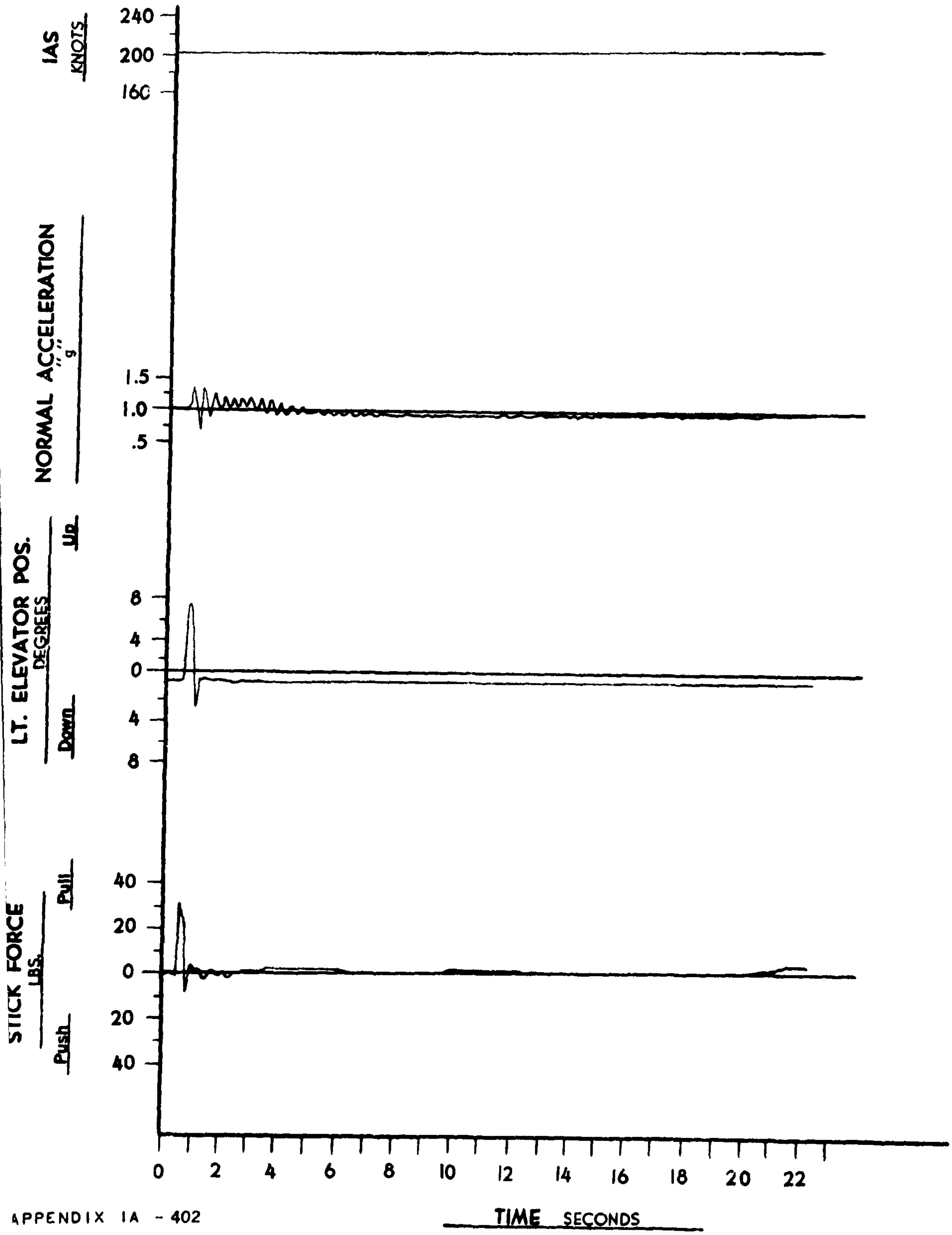


FIGURE NO. 340

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	201.5	KNOTS;	ALTITUDE	48,100	FEET
C.G.	33.5	% MAC;	WEIGHT	265,500	LBS.
AVG. N2	9130	RPM;	STABILIZER POSITION	1.5	DEG. L. E. UP

EXTERNAL TANKS INSTALLED

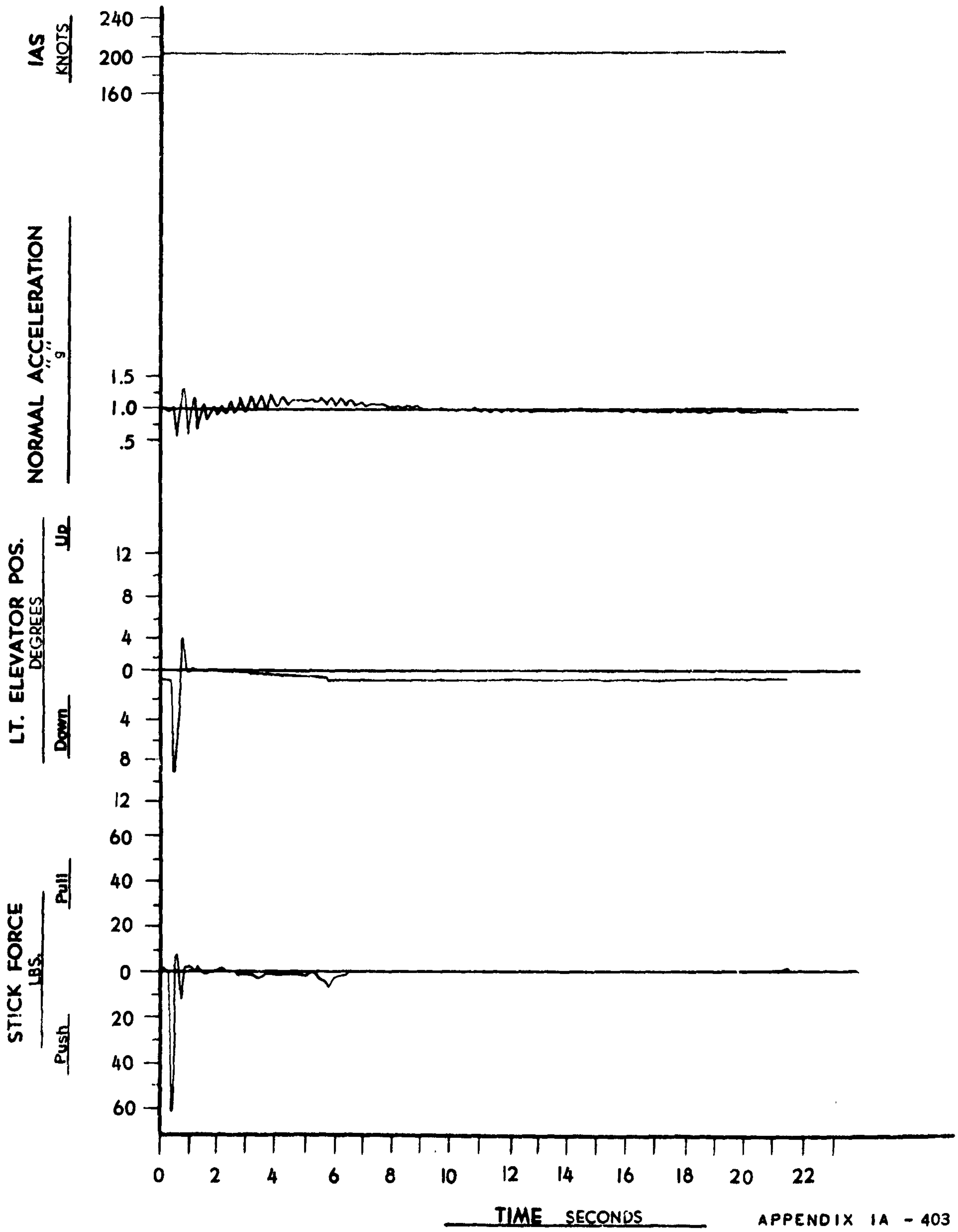


FIGURE NO. 341

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 173.5 KNOTS; ALTITUDE 47,700 FEET
C.G. 34.0 % MAC; WEIGHT 226,500 LBS.
AVG. N_2 8730 RPM; STABILIZER POSITION 0.6 DEG. L. E. UP

BOMB BAY DOORS OPEN
NO EXTERNAL TANKS INSTALLED

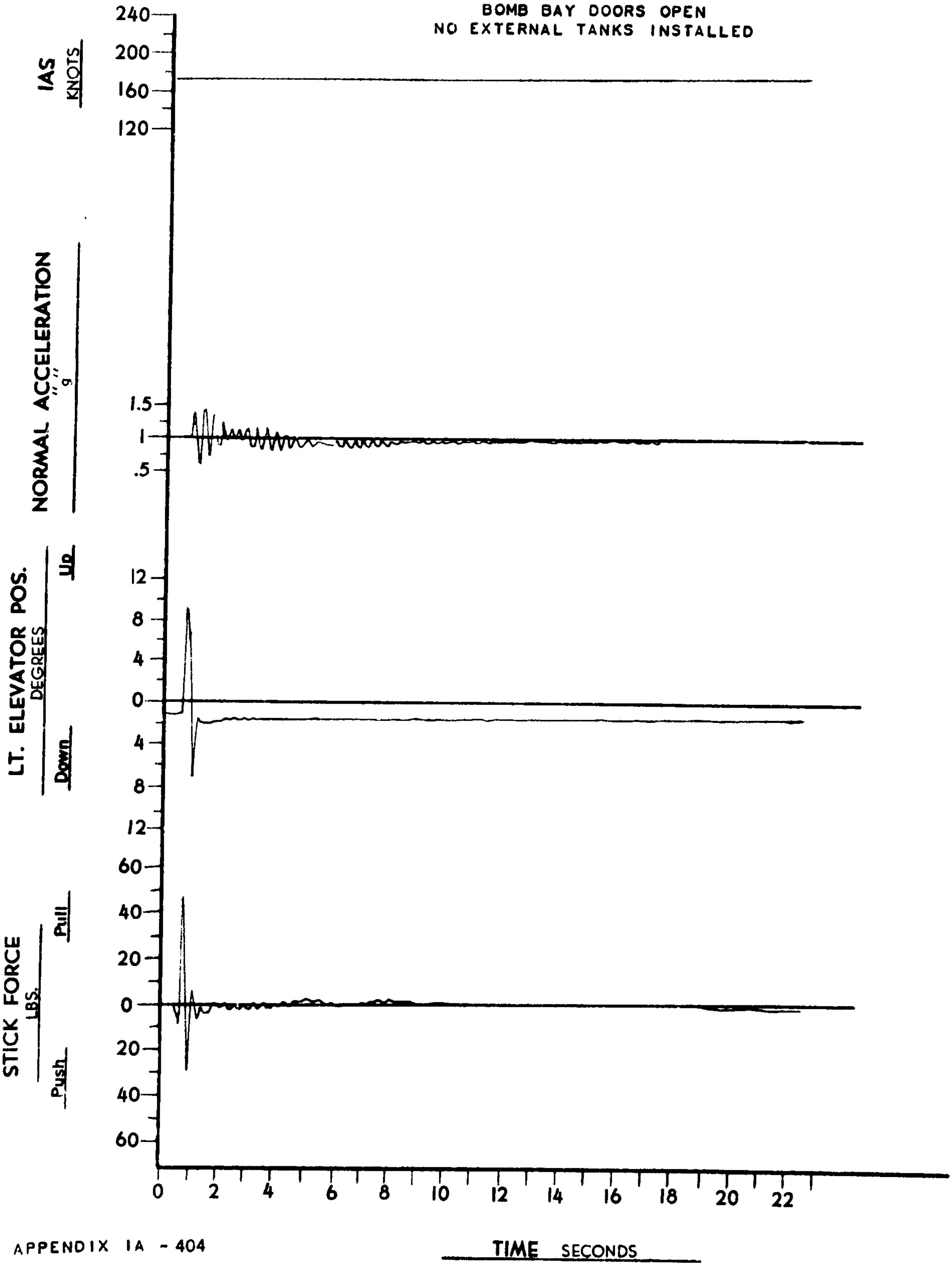


FIGURE NO. 342

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	173.5	KNOTS;	ALTITUDE	47,700	FEET
C.G.	34.0	% MAC;	WEIGHT	226,500	LBS.
AVG. N2	8730	RPM;	STABILIZER POSITION	0.6	DEG. L. E. UP

BOMB BAY DOORS OPEN
NO EXTERNAL TANKS INSTALLED

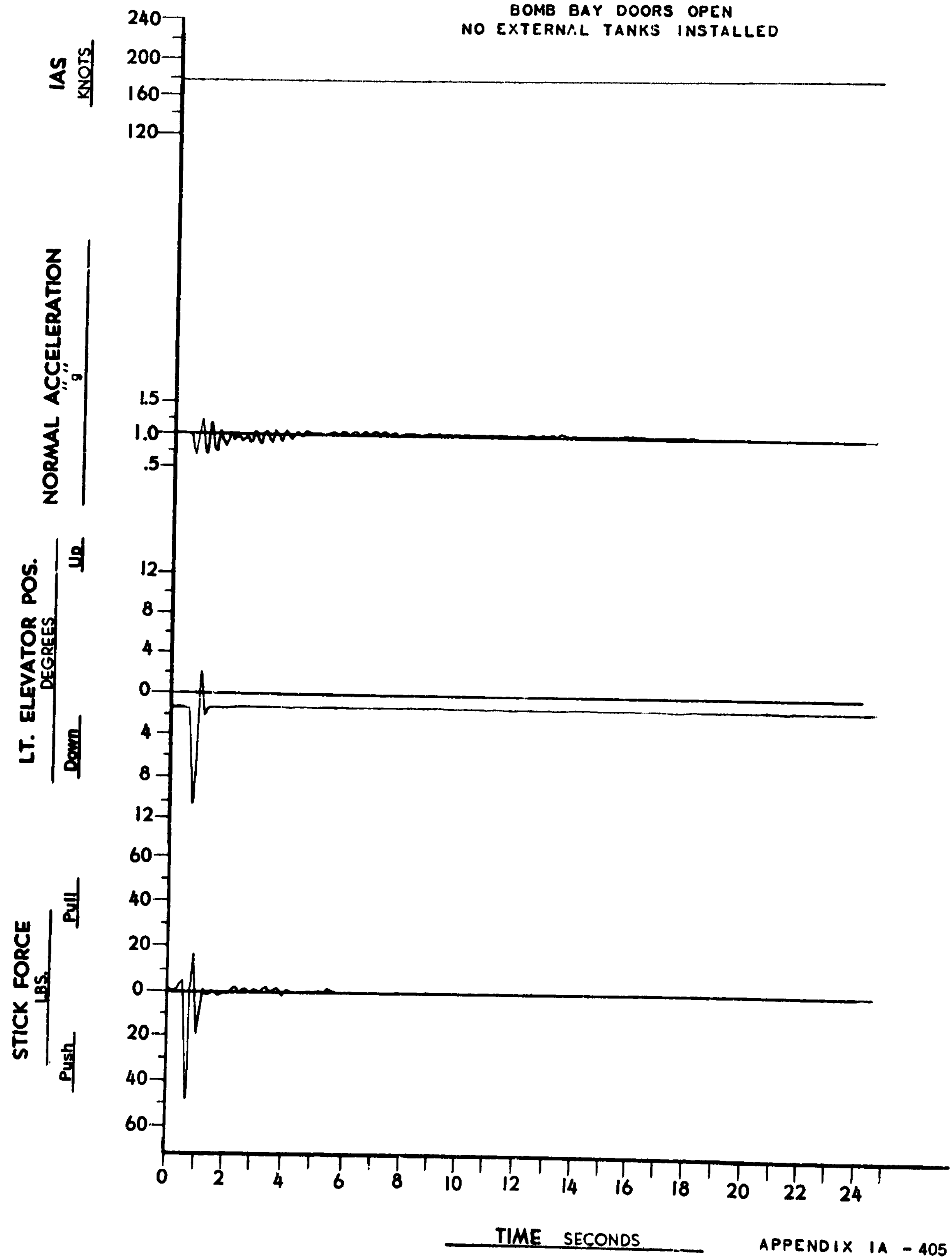


FIGURE NO. 343

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	198.5	KNOTS;	ALTITUDE	47,700	FEET
C.G.	34.3	% MAC;	WEIGHT	228,000	LBS.
AVG. N2	8930	RPM;	STABILIZER POSITION	1.2	DEG. L. E. UP

BOMB BAY DOORS OPEN
NO EXTERNAL TANKS INSTALLED

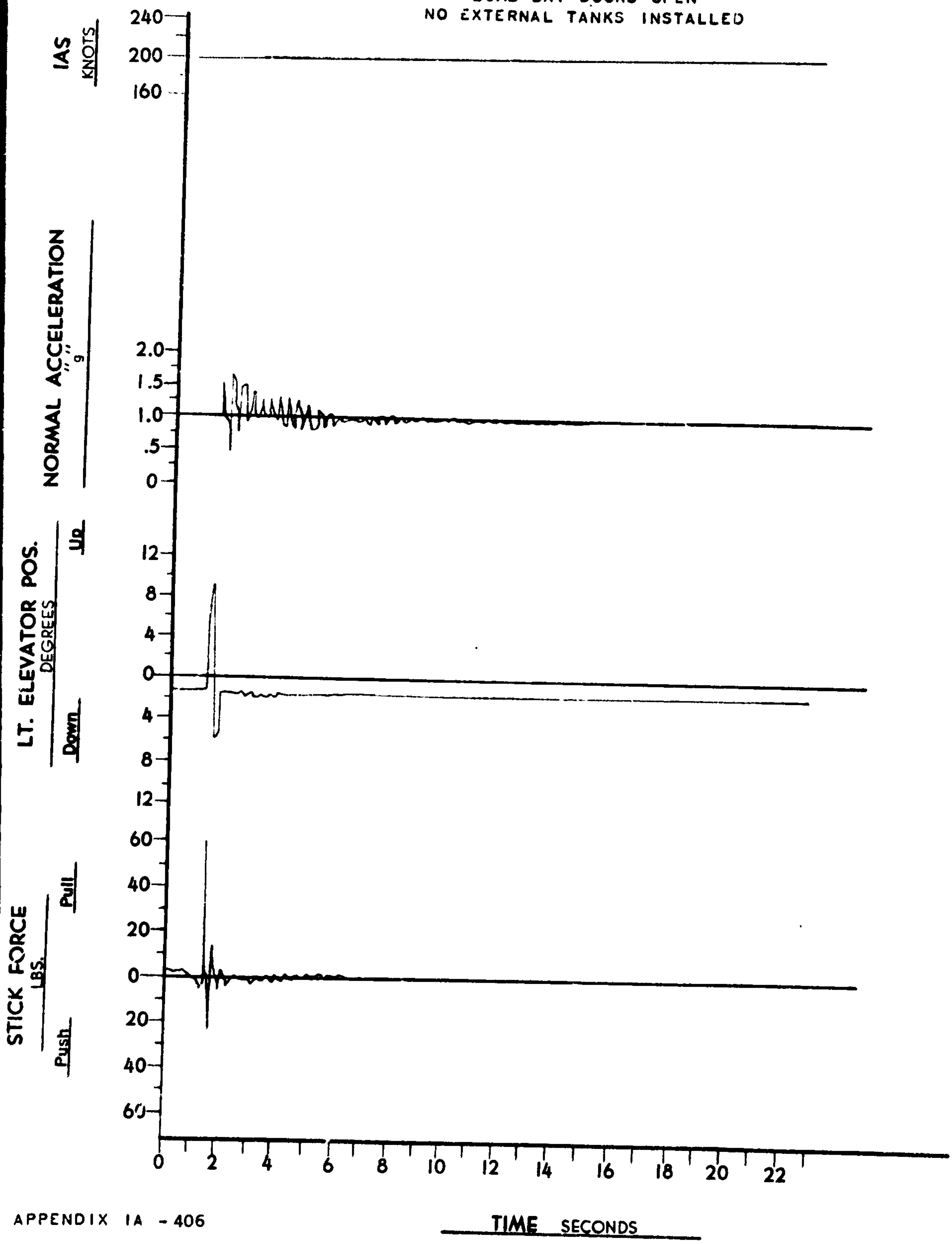


FIGURE NO. 344

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 198.5 KNOTS; ALTITUDE 47,700 FEET
C.G. 34.3 % MAC; WEIGHT 228,000 LBS.
AVG. N2 8930 RPM; STABILIZER POSITION 1.2 DEG. L. E. UP

NO EXTERNAL TANKS INSTALLED
BOMB BAY DOORS OPEN

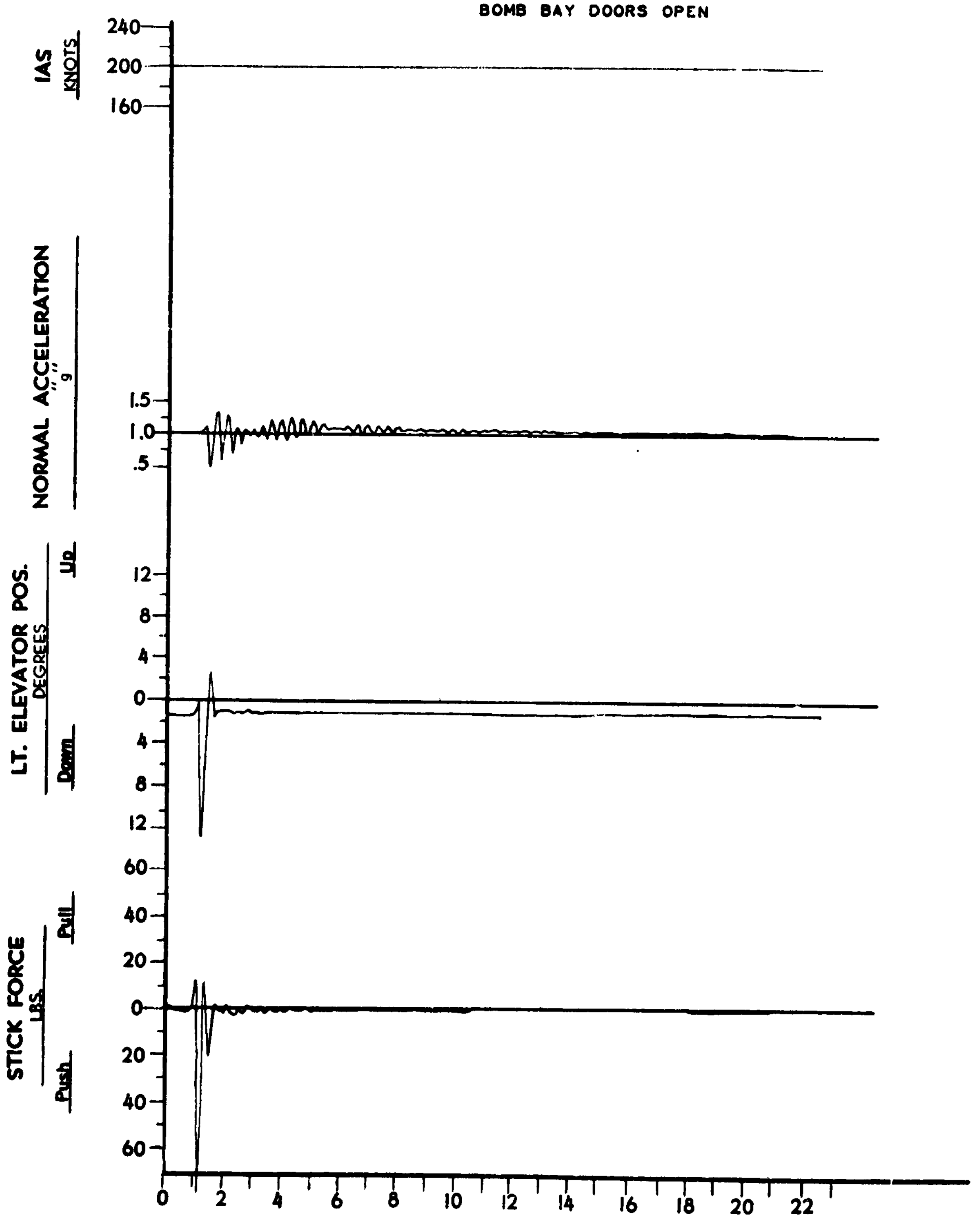


FIGURE NO. 345

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

POWER CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 215.5 KNOTS ; ALTITUDE 47,700 FEET
C.G. 34.5 % MAC; WEIGHT 230,000 LBS.
AVG. N2 9100 RPM; STABILIZER POSITION 1.4 DEG. L. E. UP

BOMB BAY DOORS OPEN
NO EXTERNAL TANKS INSTALLED

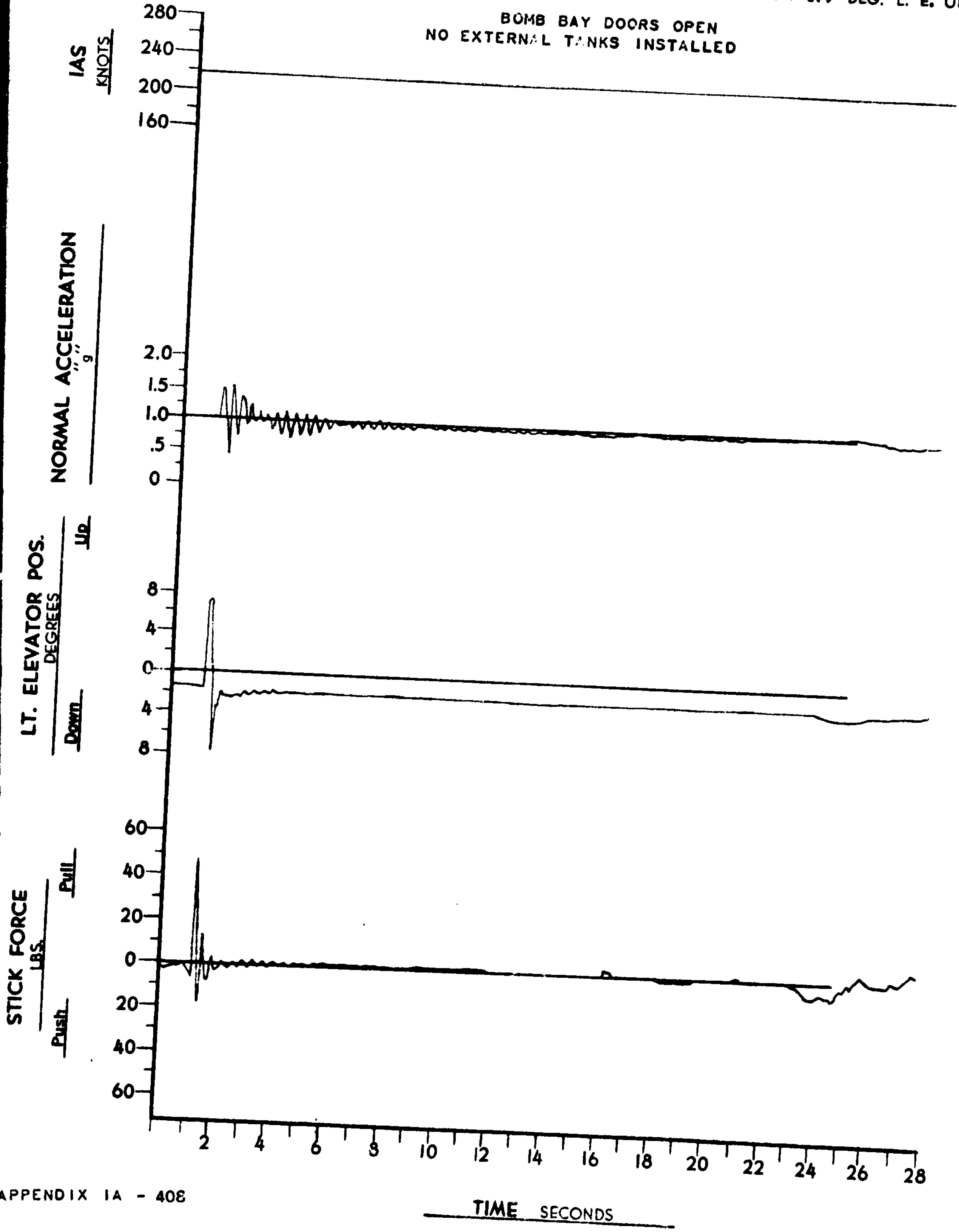


FIGURE NO.346

DYNAMIC LONGITUDINAL STABILITY

B-52A, USAF NO. 52-003

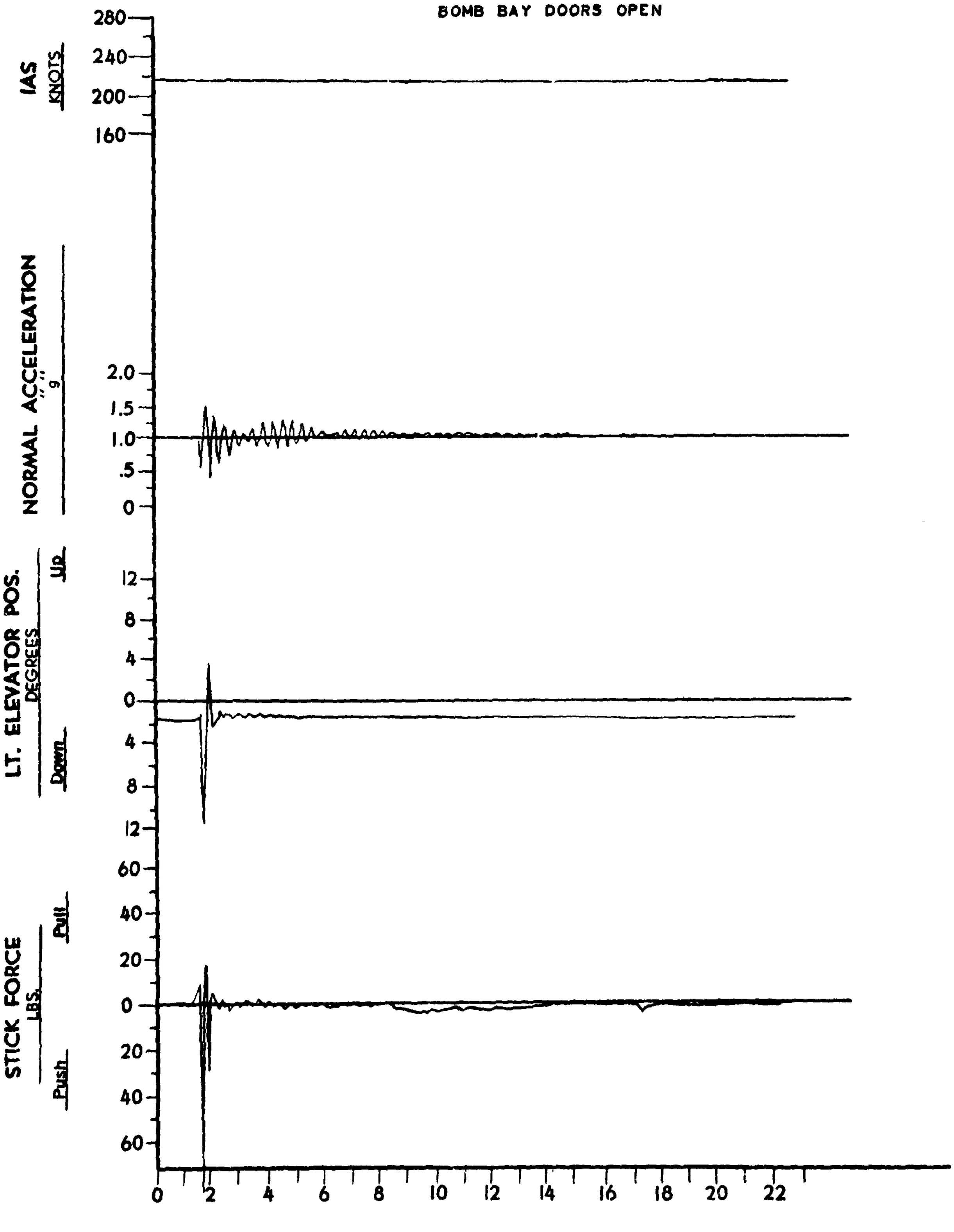
POWER CONFIGURATION : CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	215.5	KNOTS ;	ALTITUDE	47,700	FEET
C.G.	34.5	% MAC;	WEIGHT	230,000	LBS.
AVG. N_2	9100	RPM;	STABILIZER POSITION	1.4	DEG. L. E. UP

NO EXTERNAL TANKS INSTALLED

BOMB BAY DOORS OPEN



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PRESENTING PLOTS

STATIC DIRECTIONAL STABILITY

RUDDER CONTROL EFFECTIVENESS

LATERAL & DIRECTIONAL TRIM

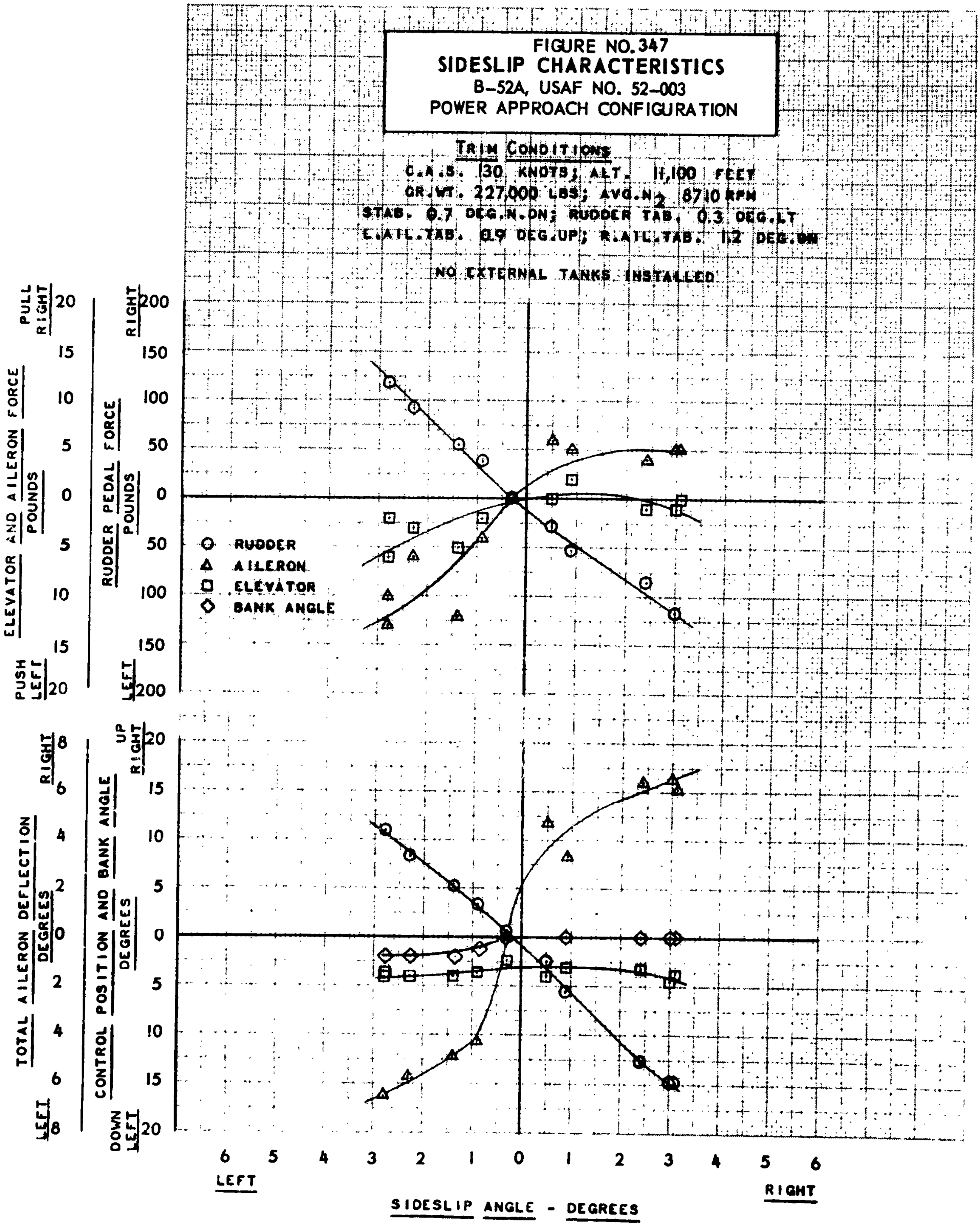

FIGURE NO. 347
SIDESLIP CHARACTERISTICS
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION
TRIM CONDITIONS
C.A.S. 130 KNOTS; ALT. 11,100 FEET
GR.WT. 227,000 LBS; AVG.N2 8710 RPM
STAB. 0.7 DEG.N.DN; RUDDER TAB. 0.3 DEG.LT
L.AIL.TAB. 0.9 DEG.UP; R.AIL.TAB. 1.2 DEG.DN
NO EXTERNAL TANKS INSTALLED
RUDDER
AILERON
ELEVATOR
BANK ANGLE
ELEVATOR AND AILERON FORCE
POUNDS
PULL
RIGHT
PUSH
LEFT
RUDDER PEDAL FORCE
POUNDS
RIGHT
LEFT
20
15
10
5
0
200
150
100
50
TOTAL AILERON DEFLECTION
DEGREES
CONTROL POSITION AND BANK ANGLE
DEGREES
UP
DOWN
8
6
4
2
SIDESLIP ANGLE - DEGREES
LEFT
RIGHT
6 5 4 3 2 1 0 1 2 3 4 5 6

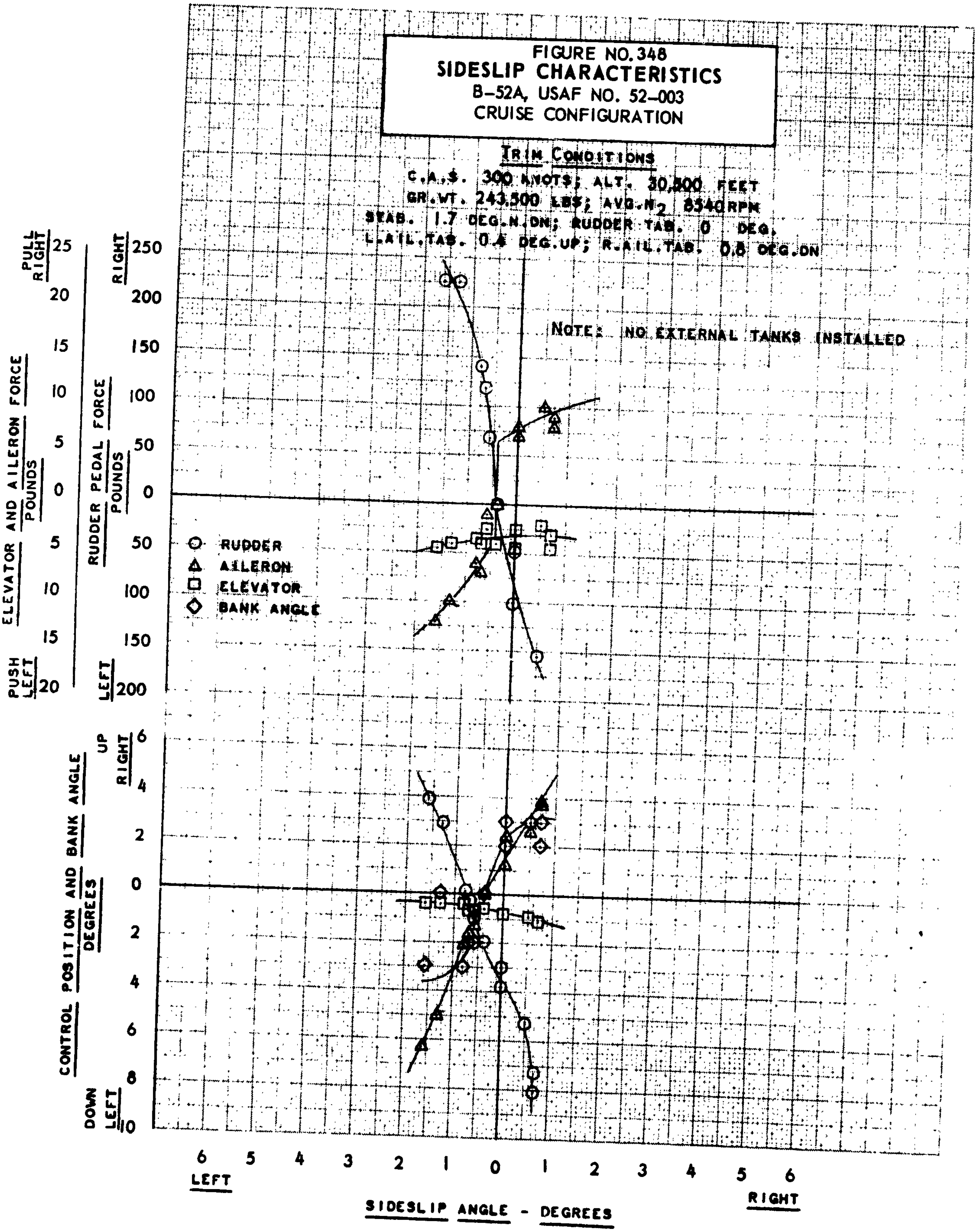
FIGURE NO. 348
SIDESLIP CHARACTERISTICS
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION
TRIM CONDITIONS
C.A.S. 300 KNOTS; ALT. 30,500 FEET
GR.WT. 243,500 LBS; AVG.N2 8540 RPM
STAB. 1.7 DEG.N.DN; RUDDER TAB. 0 DEG.
L.AIL.TAB. 0.4 DEG.UP; R.AIL.TAB. 0.8 DEG.DN
NOTE: NO EXTERNAL TANKS INSTALLED
RUDDER
AILERON
ELEVATOR
BANK ANGLE
ELEVATOR AND AILERON FORCE
POUNDS
PULL RIGHT
PUSH LEFT
RUDDER PEDAL FORCE
POUNDS
RIGHT
LEFT
CONTROL POSITION AND BANK ANGLE
DEGREES
UP RIGHT
DOWN LEFT
LEFT
RIGHT
SIDESLIP ANGLE - DEGREES

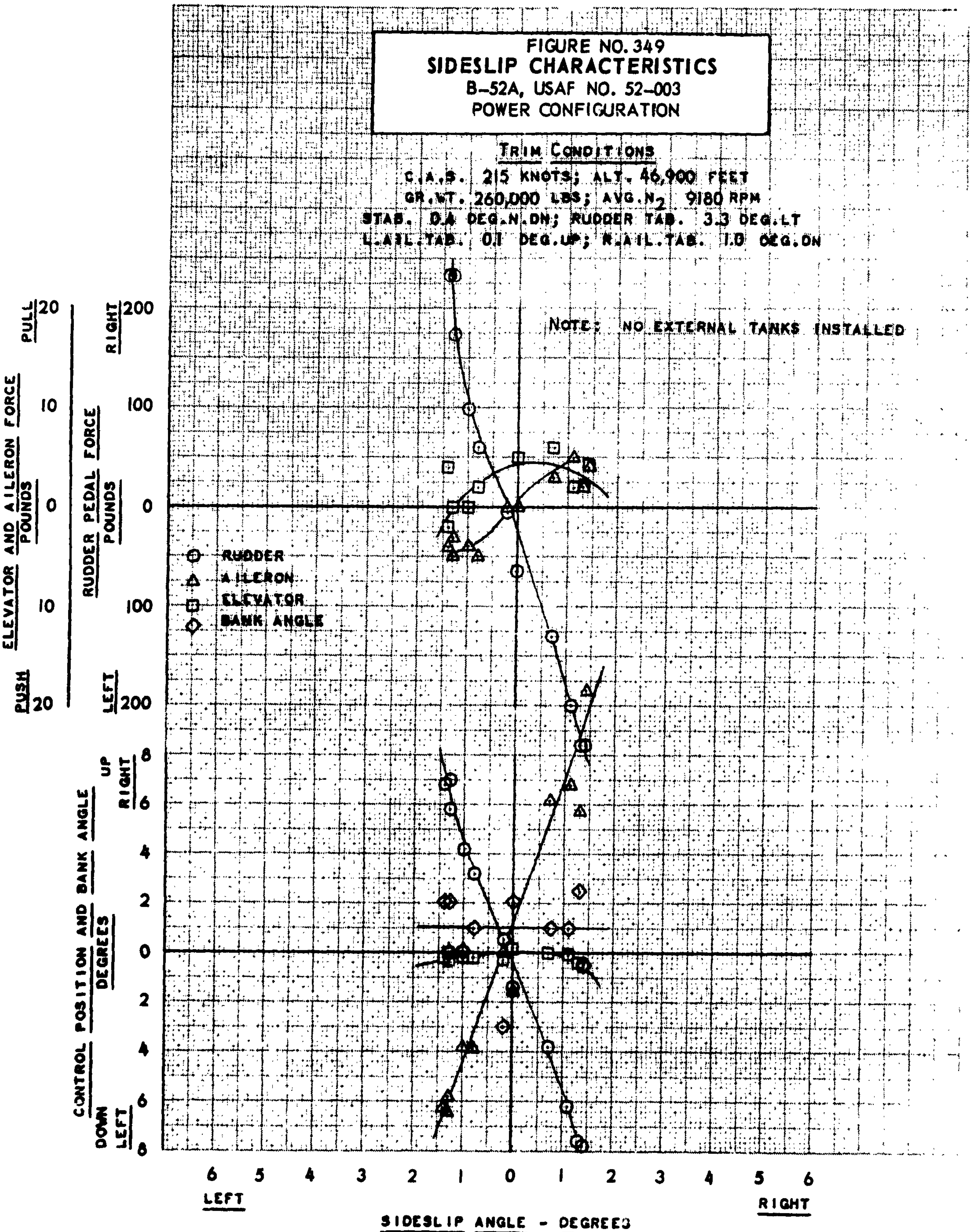
FIGURE NO. 349
SIDESLIP CHARACTERISTICS
B-52A, USAF NO. 52-003
POWER CONFIGURATION
TRIM CONDITIONS
C.A.S. 215 KNOTS; ALT. 46,900 FEET
GR.WT. 260,000 LBS; AVG.N2 9180 RPM
STAB. 0.4 DEG.N.DN; RUDDER TAB. 3.3 DEG.LT
L.AIL.TAB. 0.1 DEG.UP; R.AIL.TAB. 1.0 DEG.DN
NOTE: NO EXTERNAL TANKS INSTALLED
RUDDER
AILERON
ELEVATOR
BANK ANGLE
ELEVATOR AND AILERON FORCE
POUNDS
PULL
PUSH
RUDDER PEDAL FORCE
POUNDS
RIGHT
LEFT
CONTROL POSITION AND BANK ANGLE
DEGREES
UP
RIGHT
DOWN
LEFT
SIDESLIP ANGLE - DEGREES
LEFT
RIGHT

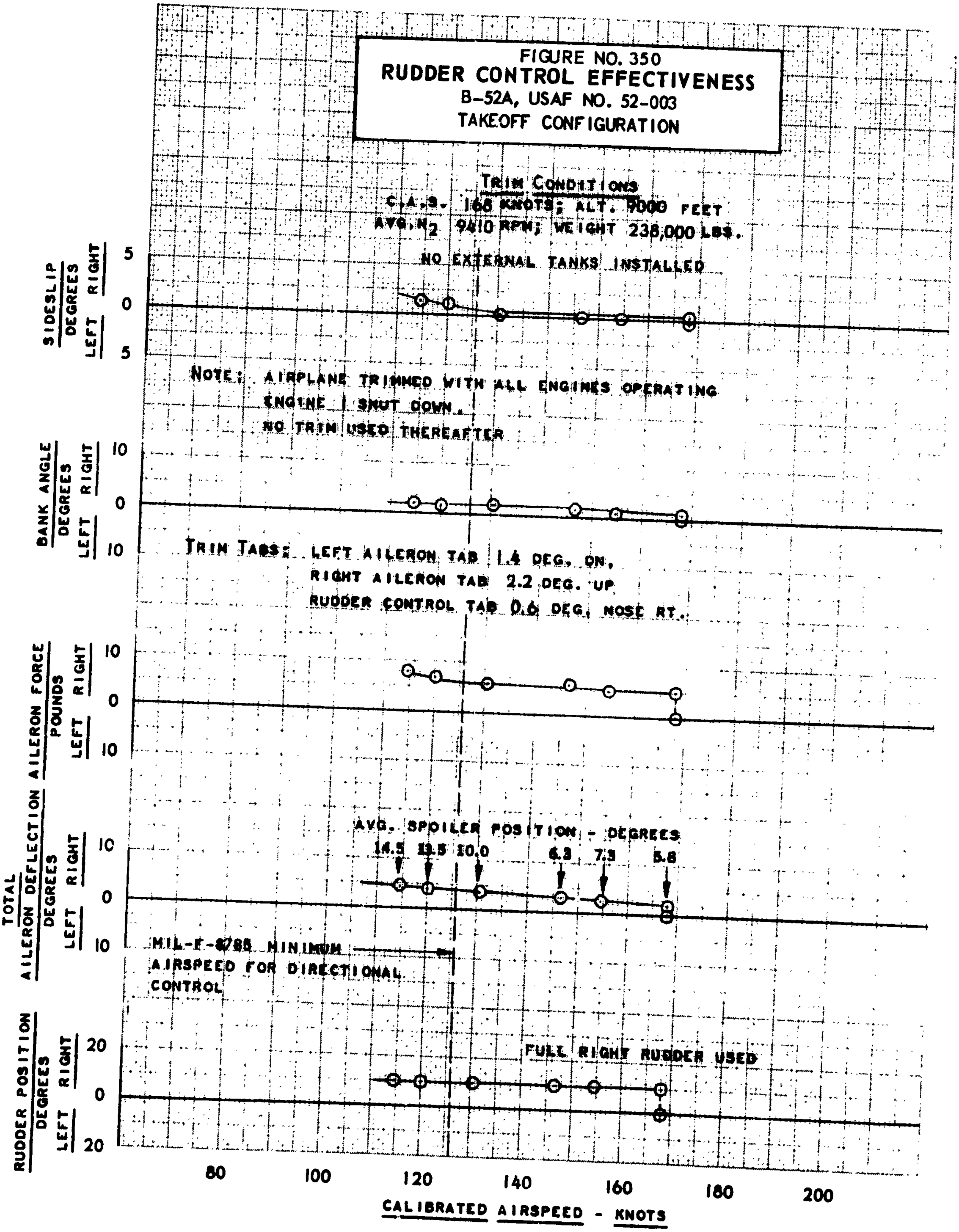
FIGURE NO. 350
RUDDER CONTROL EFFECTIVENESS
B-52A, USAF NO. 52-003
TAKEOFF CONFIGURATION
TRIM CONDITIONS
C.A.S. 168 KNOTS; ALT. 9000 FEET
AVG. N_2 9410 RPM; WEIGHT 238,000 LBS.
NO EXTERNAL TANKS INSTALLED
SIDESLIP DEGREES LEFT RIGHT
NOTE: AIRPLANE TRIMMED WITH ALL ENGINES OPERATING
ENGINE 1 SHUT DOWN.
NO TRIM USED THEREAFTER
BANK ANGLE DEGREES LEFT RIGHT
TRIM TABS: LEFT AILERON TAB 1.4 DEG. DN.
RIGHT AILERON TAB 2.2 DEG. UP
RUDDER CONTROL TAB 0.6 DEG. NOSE RT.
AILERON FORCE POUNDS LEFT RIGHT
AVG. SPOILER POSITION - DEGREES
14.5 13.5 10.0 6.3 7.3 5.8
TOTAL AILERON DEFLECTION DEGREES LEFT RIGHT
MIL-F-8785 MINIMUM AIRSPEED FOR DIRECTIONAL CONTROL
FULL RIGHT RUDDER USED
RUDDER POSITION DEGREES LEFT RIGHT
80 100 120 140 160 180 200
CALIBRATED AIRSPEED - KNOTS

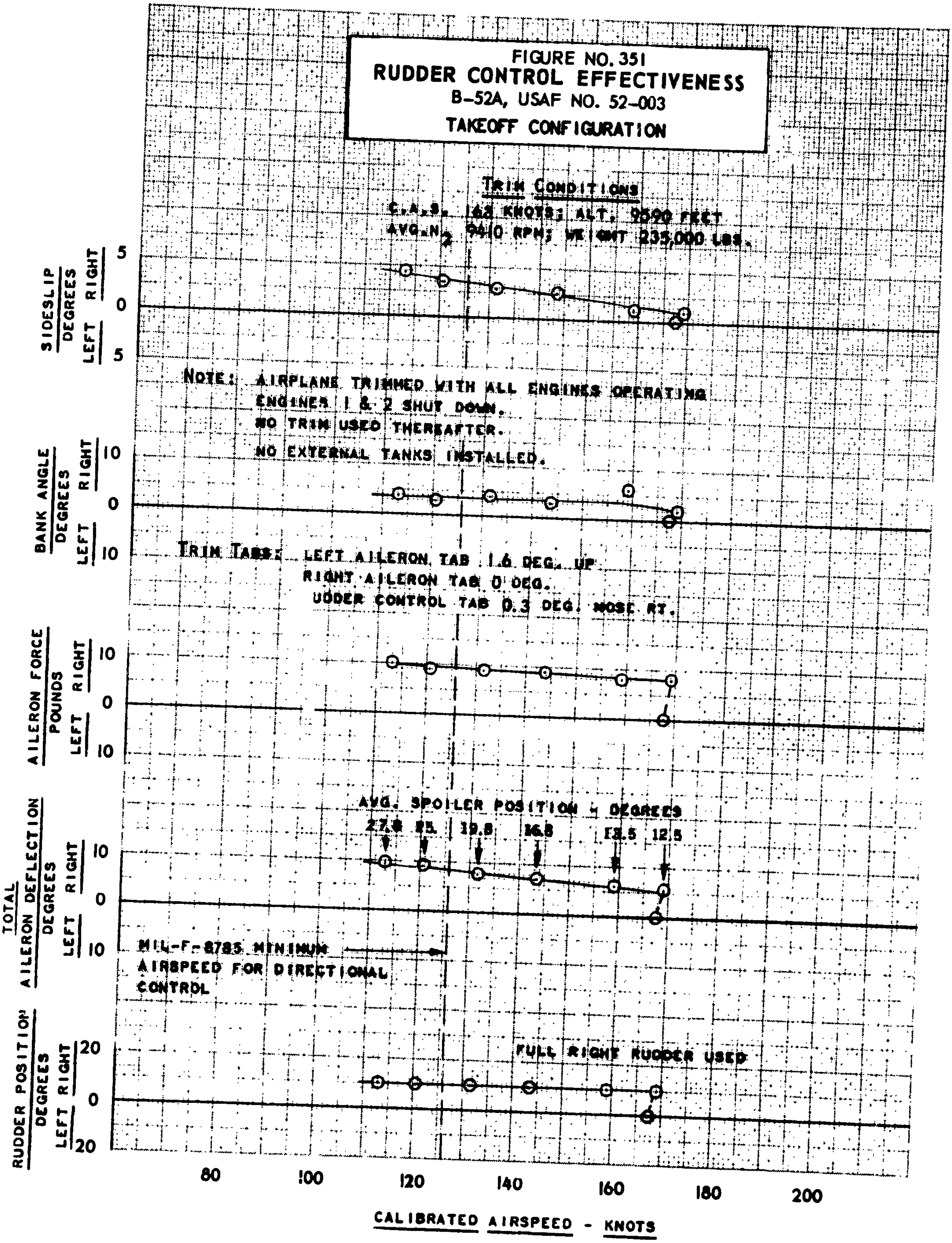
FIGURE NO. 351
RUDDER CONTROL EFFECTIVENESS
B-52A, USAF NO. 52-003
TAKEOFF CONFIGURATION
TRIM CONDITIONS
C.A.S. 162 KNOTS; ALT. 9590 FEET
AVG. N2 9410 RPM; WEIGHT 235,000 LBS.
SIDESLIP DEGREES LEFT RIGHT
NOTE: AIRPLANE TRIMMED WITH ALL ENGINES OPERATING
ENGINES 1 & 2 SHUT DOWN.
NO TRIM USED THEREAFTER.
NO EXTERNAL TANKS INSTALLED.
BANK ANGLE DEGREES LEFT RIGHT
TRIM TABS: LEFT AILERON TAB 1.6 DEG. UP
RIGHT AILERON TAB 0 DEG.
UDDER CONTROL TAB 0.3 DEG. NOSE RT.
AILERON FORCE POUNDS LEFT RIGHT
AVG. SPOILER POSITION - DEGREES
27.8
25
19.8
16.8
13.5
12.5
TOTAL AILERON DEFLECTION DEGREES LEFT RIGHT
MIL-F-8785 MINIMUM AIRSPEED FOR DIRECTIONAL CONTROL
FULL RIGHT RUDDER USED
RUDDER POSITION DEGREES LEFT RIGHT
80
100
120
140
160
180
200
CALIBRATED AIRSPEED - KNOTS

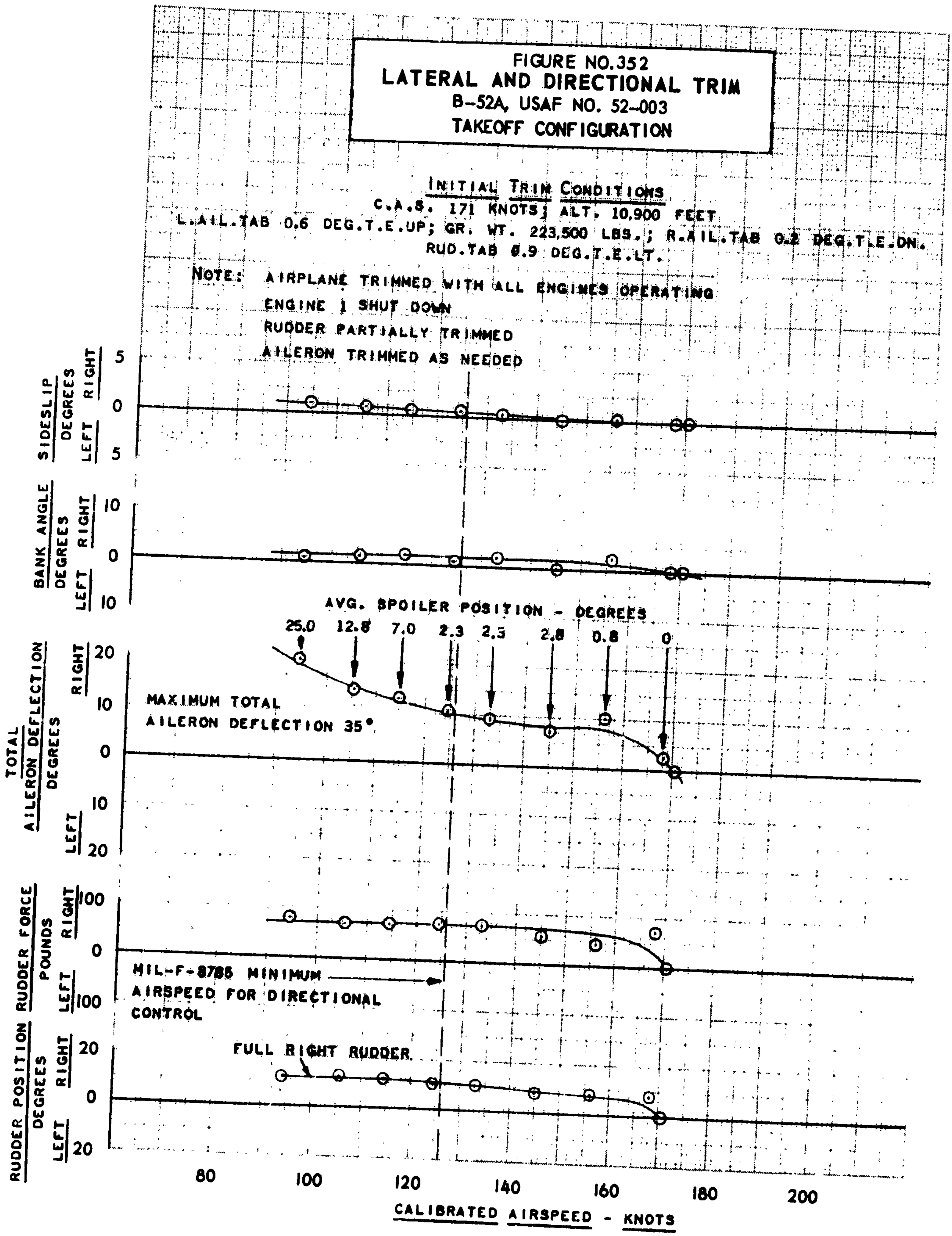
FIGURE NO.352
LATERAL AND DIRECTIONAL TRIM
B-52A, USAF NO. 52-003
TAKEOFF CONFIGURATION
INITIAL TRIM CONDITIONS
C.A.S. 171 KNOTS; ALT. 10,900 FEET
L.AIL.TAB 0.6 DEG.T.E.UP; GR. WT. 223,500 LBS.; R.AIL.TAB 0.2 DEG.T.E.DN.
RUD.TAB 0.9 DEG.T.E.LT.
NOTE: AIRPLANE TRIMMED WITH ALL ENGINES OPERATING
ENGINE 1 SHUT DOWN
RUDDER PARTIALLY TRIMMED
AILERON TRIMMED AS NEEDED
SIDESLIP DEGREES
LEFT RIGHT
5
0
5
BANK ANGLE DEGREES
LEFT RIGHT
10
0
10
AVG. SPOILER POSITION - DEGREES
25.0 12.8 7.0 2.3 2.5 2.8 0.8 0
TOTAL AILERON DEFLECTION DEGREES
LEFT RIGHT
20
10
0
10
20
MAXIMUM TOTAL AILERON DEFLECTION 35°
RUDDER FORCE POUNDS
LEFT RIGHT
100
0
100
MIL-F-8785 MINIMUM AIRSPEED FOR DIRECTIONAL CONTROL
RUDDER POSITION DEGREES
LEFT RIGHT
20
0
20
FULL RIGHT RUDDER
80 100 120 140 160 180 200
CALIBRATED AIRSPEED - KNOTS

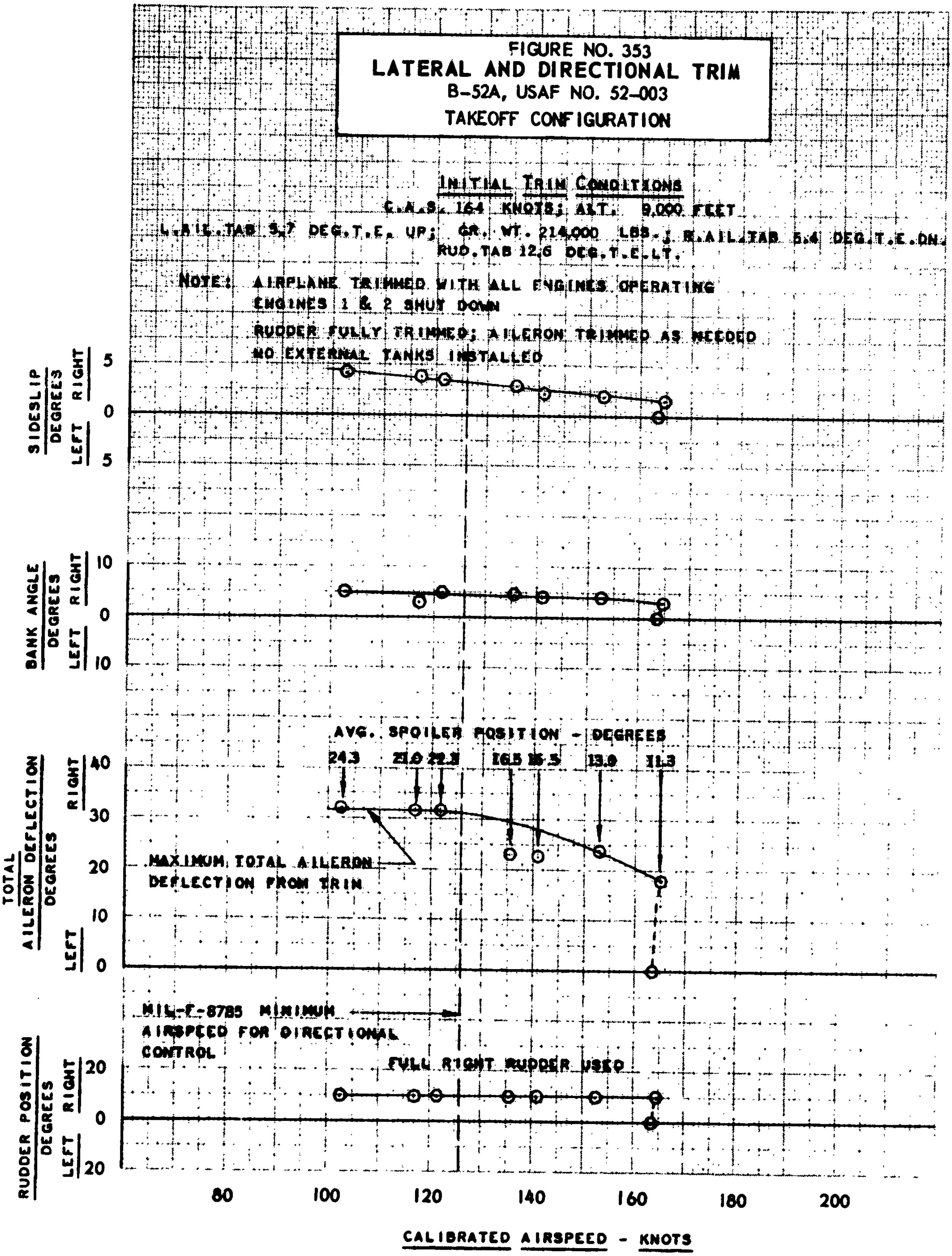

FIGURE NO. 353
LATERAL AND DIRECTIONAL TRIM
B-52A, USAF NO. 52-003
TAKEOFF CONFIGURATION

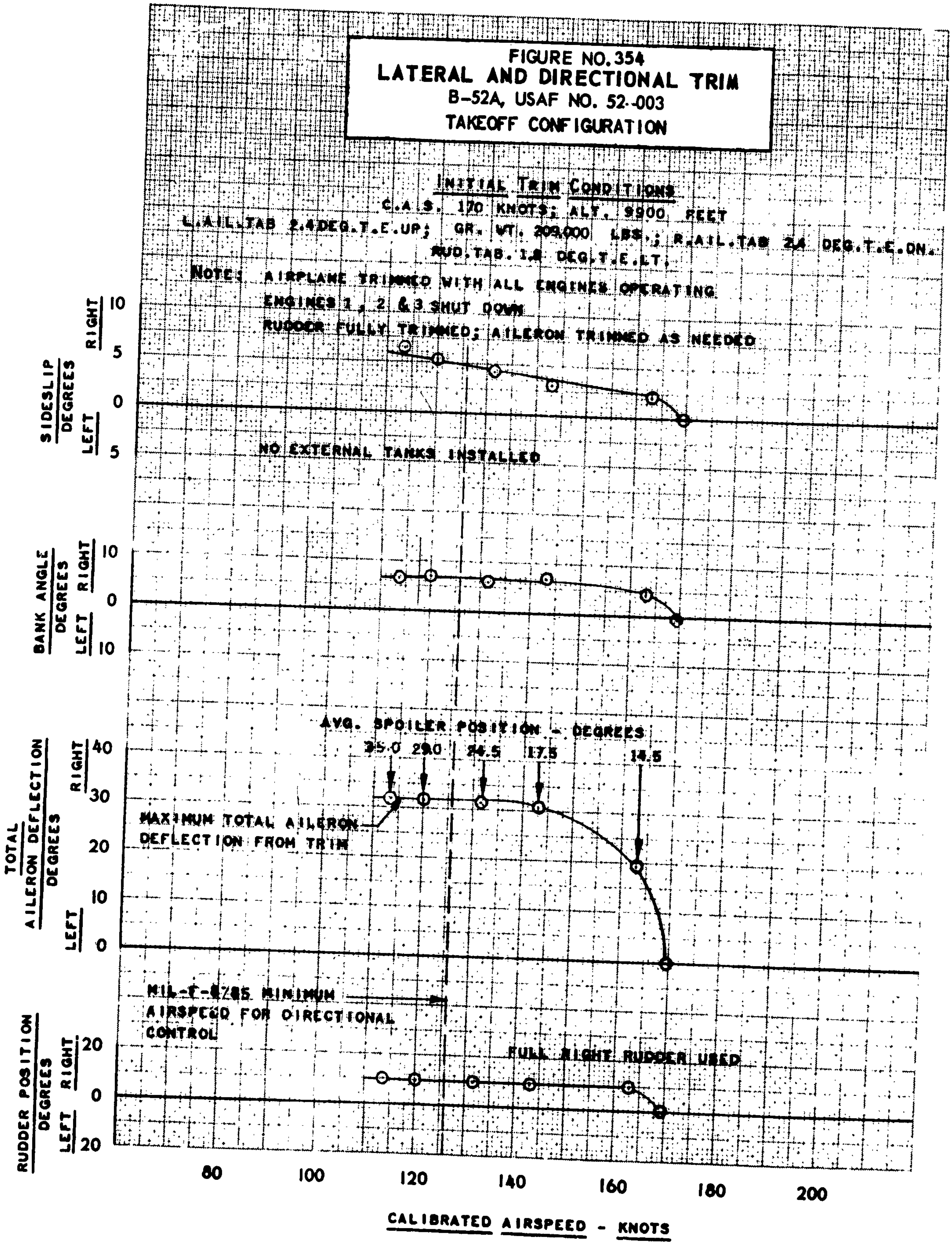
FIGURE NO. 354
LATERAL AND DIRECTIONAL TRIM
B-52A, USAF NO. 52-003
TAKEOFF CONFIGURATION
INITIAL TRIM CONDITIONS
C.A.S. 170 KNOTS; ALT. 9900 FEET
L.AIL.TAB 2.4 DEG.T.E.UP; GR. WT. 209,000 LBS.; R.AIL.TAB 2.4 DEG.T.E.DN.
RUD.TAB. 1.8 DEG.T.E.LT.
NOTE: AIRPLANE TRIMMED WITH ALL ENGINES OPERATING
ENGINES 1, 2 & 3 SHUT DOWN
RUDDER FULLY TRIMMED; AILERON TRIMMED AS NEEDED
SIDESLIP DEGREES
RIGHT
LEFT
10
5
0
5
NO EXTERNAL TANKS INSTALLED
BANK ANGLE DEGREES
RIGHT
LEFT
10
0
10
AVG. SPOILER POSITION - DEGREES
35.0
29.0
24.5
17.5
14.5
TOTAL AILERON DEFLECTION DEGREES
RIGHT
LEFT
40
30
20
10
0
MAXIMUM TOTAL AILERON DEFLECTION FROM TRIM
MIL-F-8785 MINIMUM AIRSPEED FOR DIRECTIONAL CONTROL
FULL RIGHT RUDDER USED
RUDDER POSITION DEGREES
RIGHT
LEFT
20
0
20
80
100
120
140
160
180
200
CALIBRATED AIRSPEED - KNOTS

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PRESENTING PLOTS

DYNAMIC

LATERAL - DIRECTIONAL

STABILITY

FIGURE NO. 355

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

POWER APPROACH CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 128 KNOTS ; ALTITUDE 10,600 FEET
C.G. 34.2 % MAC; WEIGHT 233,500 LBS.
RUDDER TAB 2.4 DEG. T.E. LT.; L. AIL. TAB 0.4 DEG. T. E. UP
AVG. N2 8670 RPM; R. AIL. TAB. 0.2 DEG. T. E. DN.
NO EXTERNAL TANKS INSTALLED

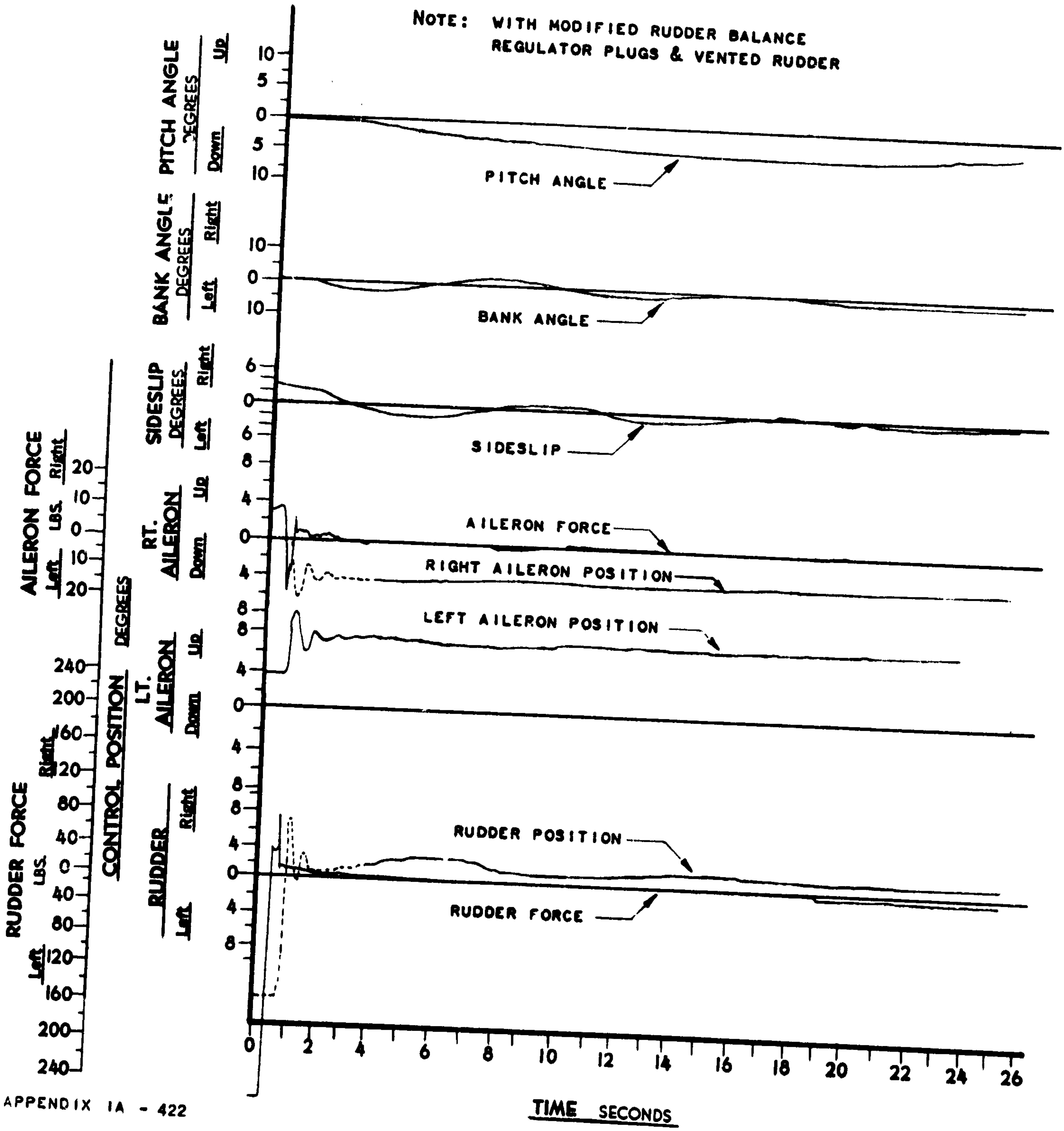


FIGURE NO. 356

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

POWER APPROACH CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	128	KNOTS ;	ALTITUDE	10,600	FEET
C.G.	34.2	% MAC;	WEIGHT	233,500	LBS.
RUDDER TAB	2.4 DEG. T. E. LT.		L. AIL. TAB	0.4 DEG.	T. E. UP
AVG. N_2	8670	RPM;	R. AIL. TAB.	0.2 DEG.	T. E. DN.

NO EXTERNAL TANKS INSTALLED

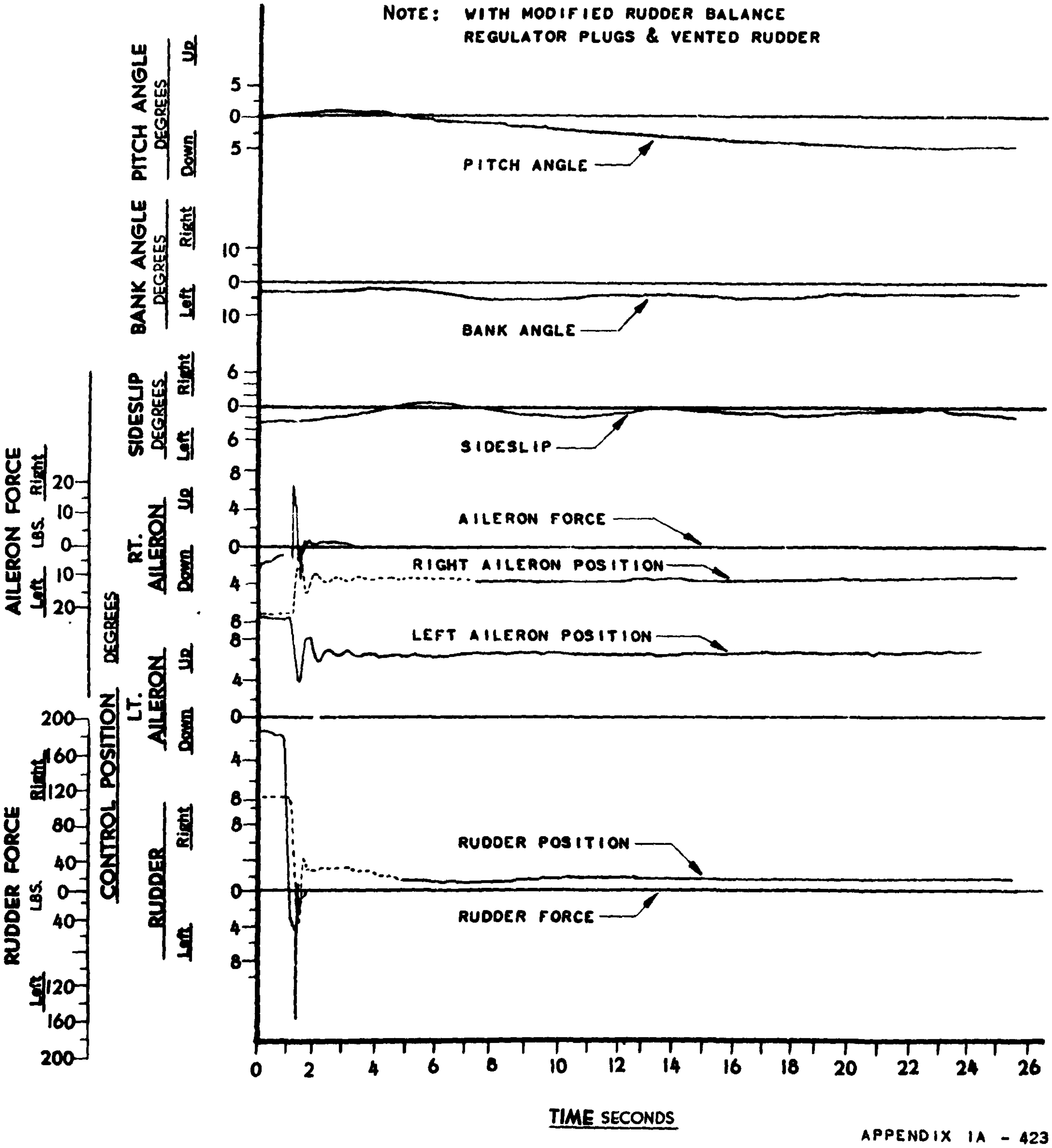


FIGURE NO. 357

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 324.0 KNOTS; ALTITUDE 10,000 FEET
C.G. 27.6 % MAC; WEIGHT 224,000 LBS.
RUDDER TAB 0.3 DEG. T. E. RT. L. AIL. TAB 0.9 DEG. T. E. UP
AVG. N_2 8870 RPM; R. AIL. TAB. 1.6 DEG. T. E. DN.
NO EXTERNAL TANKS INSTALLED

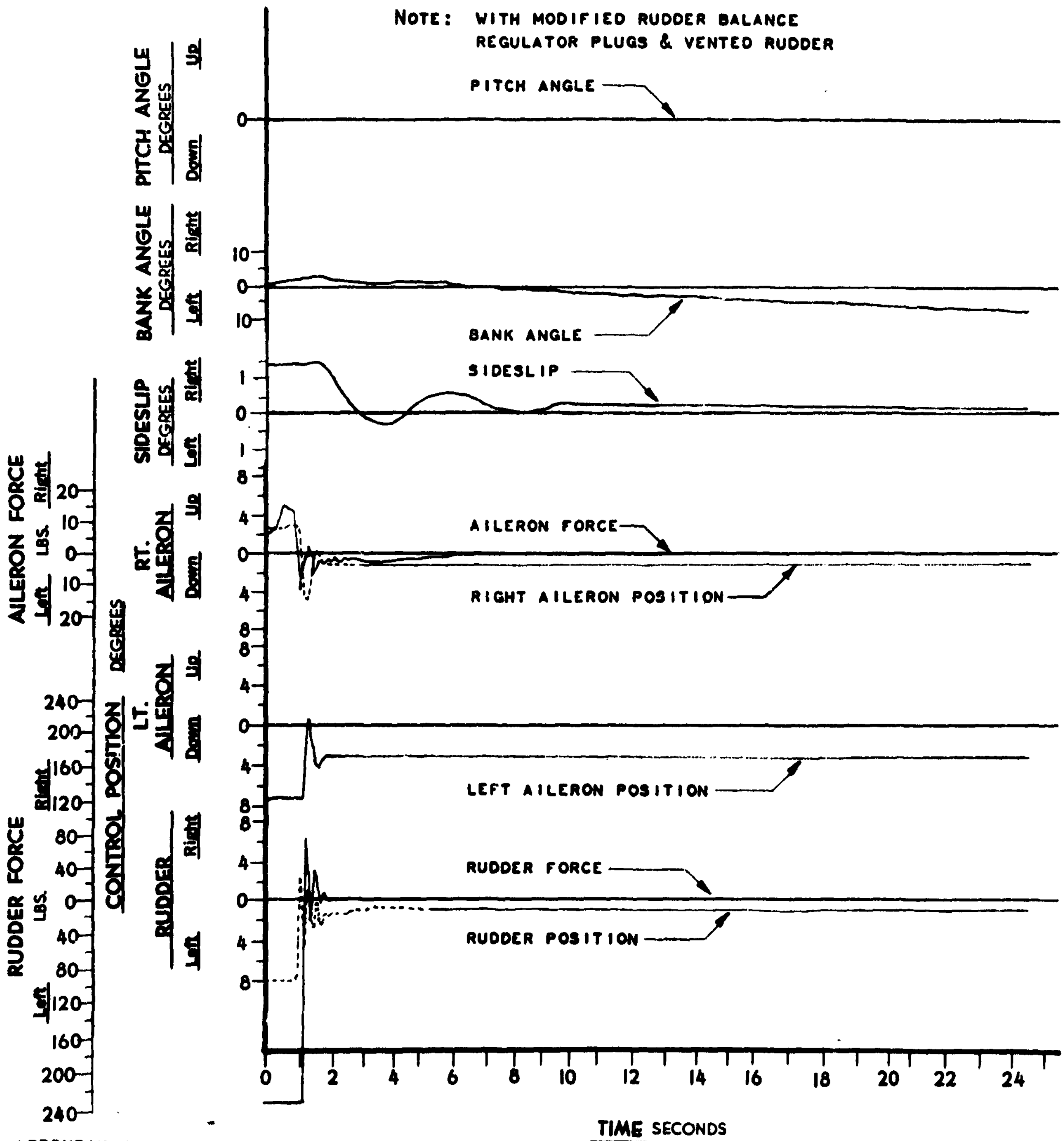


FIGURE NO. 358

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	324.0 KNOTS;	ALTITUDE	10,000	FEET
C.G.	27.6 % MAC;	WEIGHT	224,000	LBS.
RUDDER TAB	0.3 DEG. T. E. RT;	L. AIL. TAB	0.9	DEG. T. E. UP
AVG. N2	8870 RPM;	R. AIL. TAB.	1.6	DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: WITH MODIFIED RUDDER BALANCE REGULATOR PLUGS & VENTED RUDDER

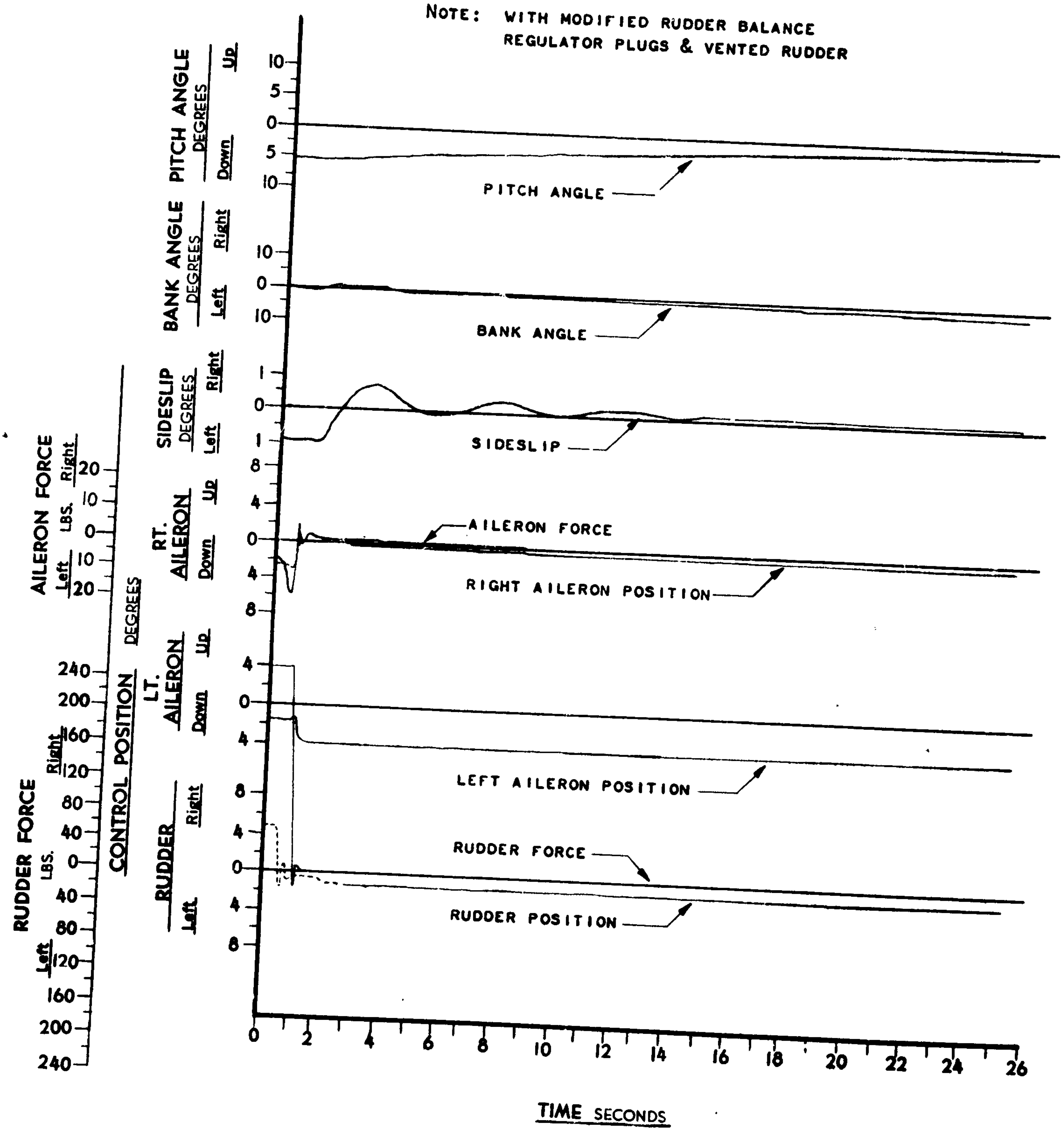


FIGURE NO. 359

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION ; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	223.5	KNOTS ;	ALTITUDE	29,700	FEET
C.G.	18.9	% MAC;	WEIGHT	251,500	LBS.
RUDDER TAB	0 DEG.	;	L. AIL. TAB	0.9	DEG. T. E. UP
AVG. N_2	8250	RPM;	R. AIL. TAB.	1.3	DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

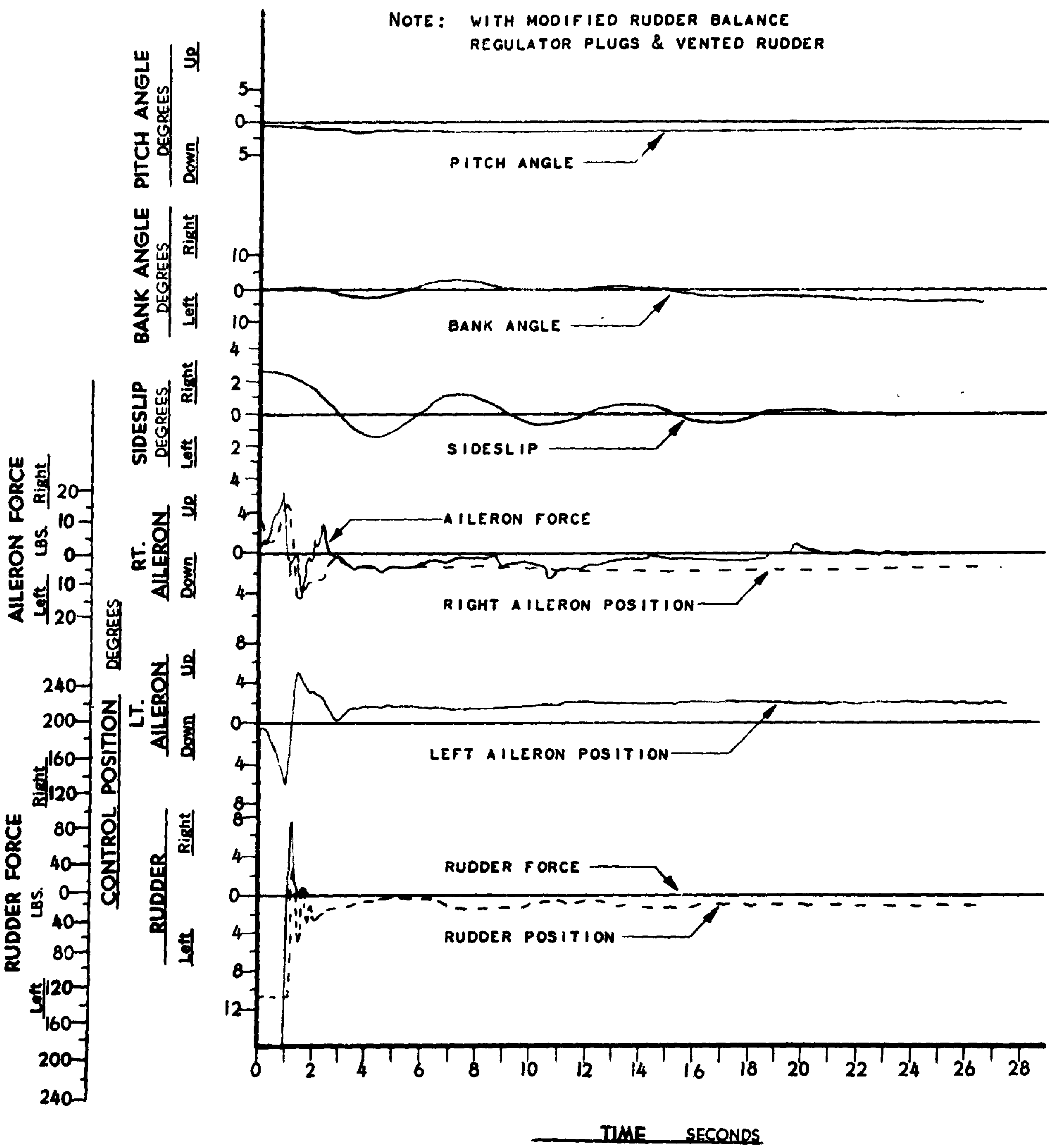


FIGURE NO. 360

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION ; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	223.5	KNOTS ;	ALTITUDE	29,700	FEET
C.G.	18.9	% MAC;	WEIGHT	251,500	LBS.
RUDDER TAB	0	DEG. ;	L. AIL. TAB	0.9 DEG.	T. E. UP
AVG. N2	8250	RPM;	R. AIL. TAB.	1.3 DEG.	T. E. DN.

NO EXTERNAL TANKS INSTALLED

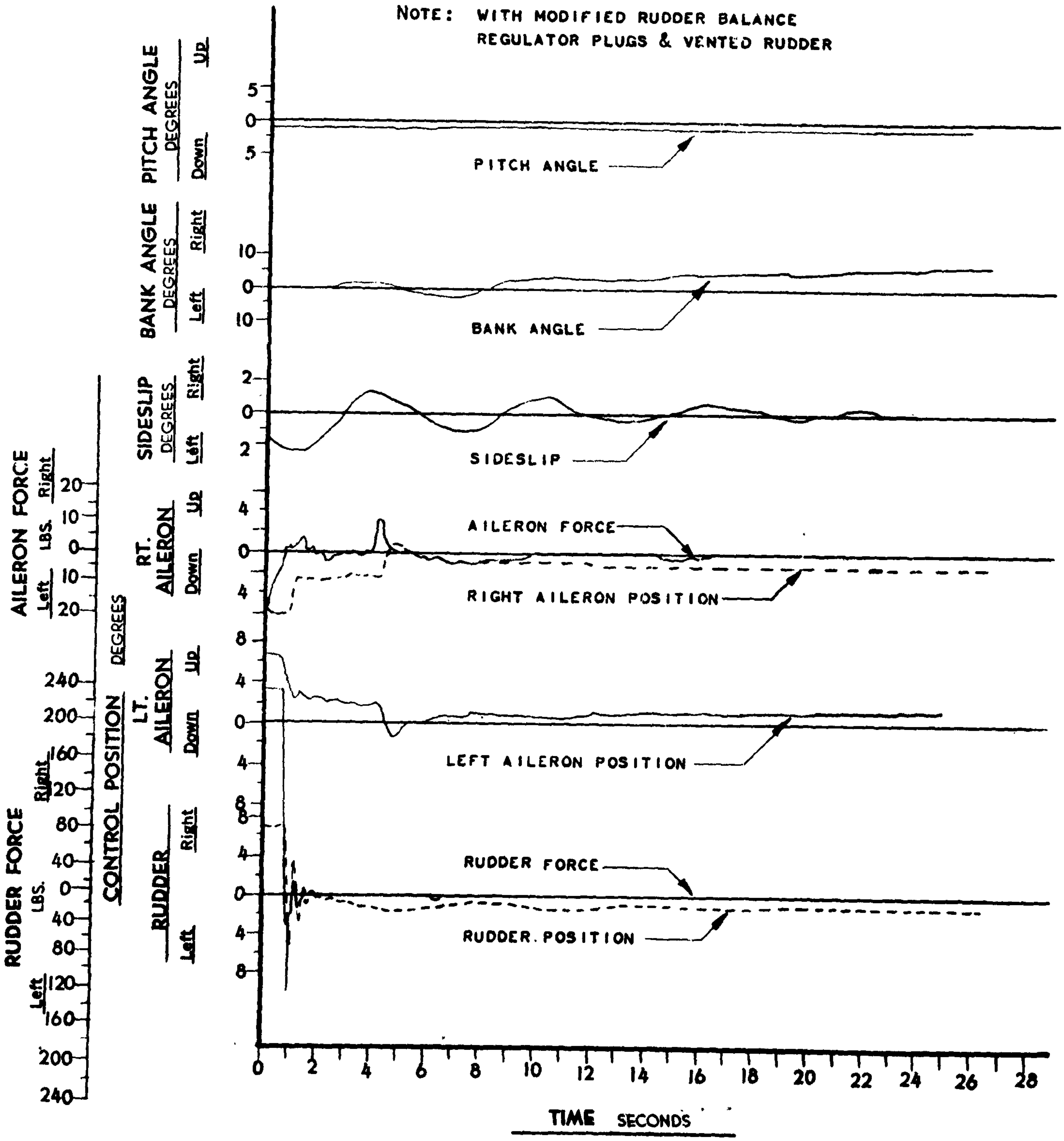


FIGURE NO. 361

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION ; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	303	KNOTS ;	ALTITUDE	29,700	FEET
C.G.	19.4	% MAC;	WEIGHT	251,000	LBS.
RUDDER	TAB .2 DEG. T. E. RT ;		L. AIL. TAB	1.0	DEG. T. E. UP
AVG. N2	8480	RPM;	R. AIL. TAB.	1.5	DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: WITH MODIFIED RUDDER BALANCE REGULATOR PLUGS & VENTED RUDDER

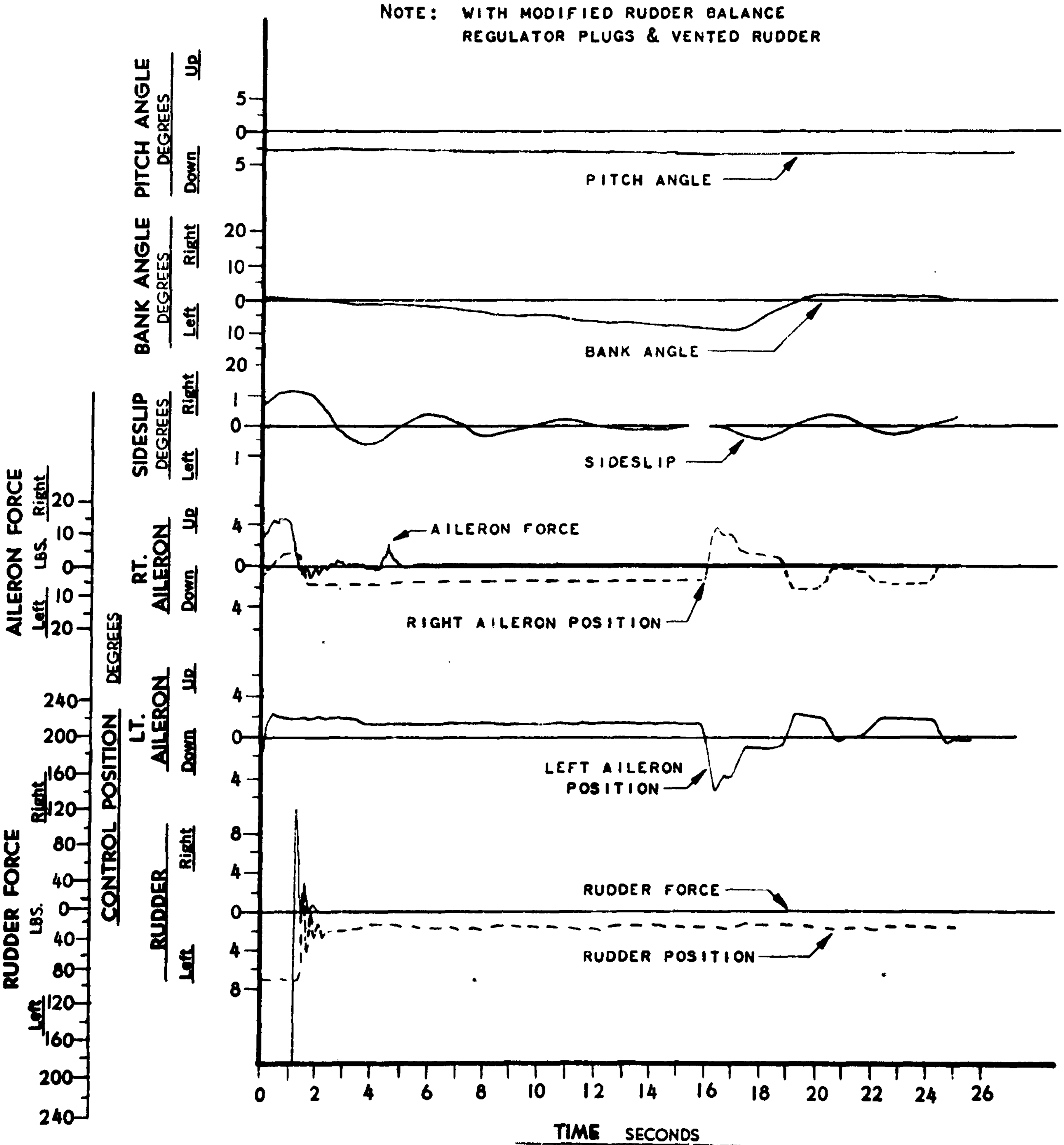


FIGURE NO. 362

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION ; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	303	KNOTS ;	ALTITUDE	29,700	FEET
C.G.	19.4	% MAC;	WEIGHT	251,000	LBS.
RUDDER TAB .2 DEG. T. E. RT;			L. AIL. TAB 1.0 DEG. T. E. UP		
AVG. N_2	8480	RPM;	R. AIL. TAB. 1.5 DEG. T. E. DN.		

NO EXTERNAL TANKS INSTALLED

NOTE: WITH MODIFIED RUDDER BALANCE REGULATOR PLUGS & VENTED RUDDER

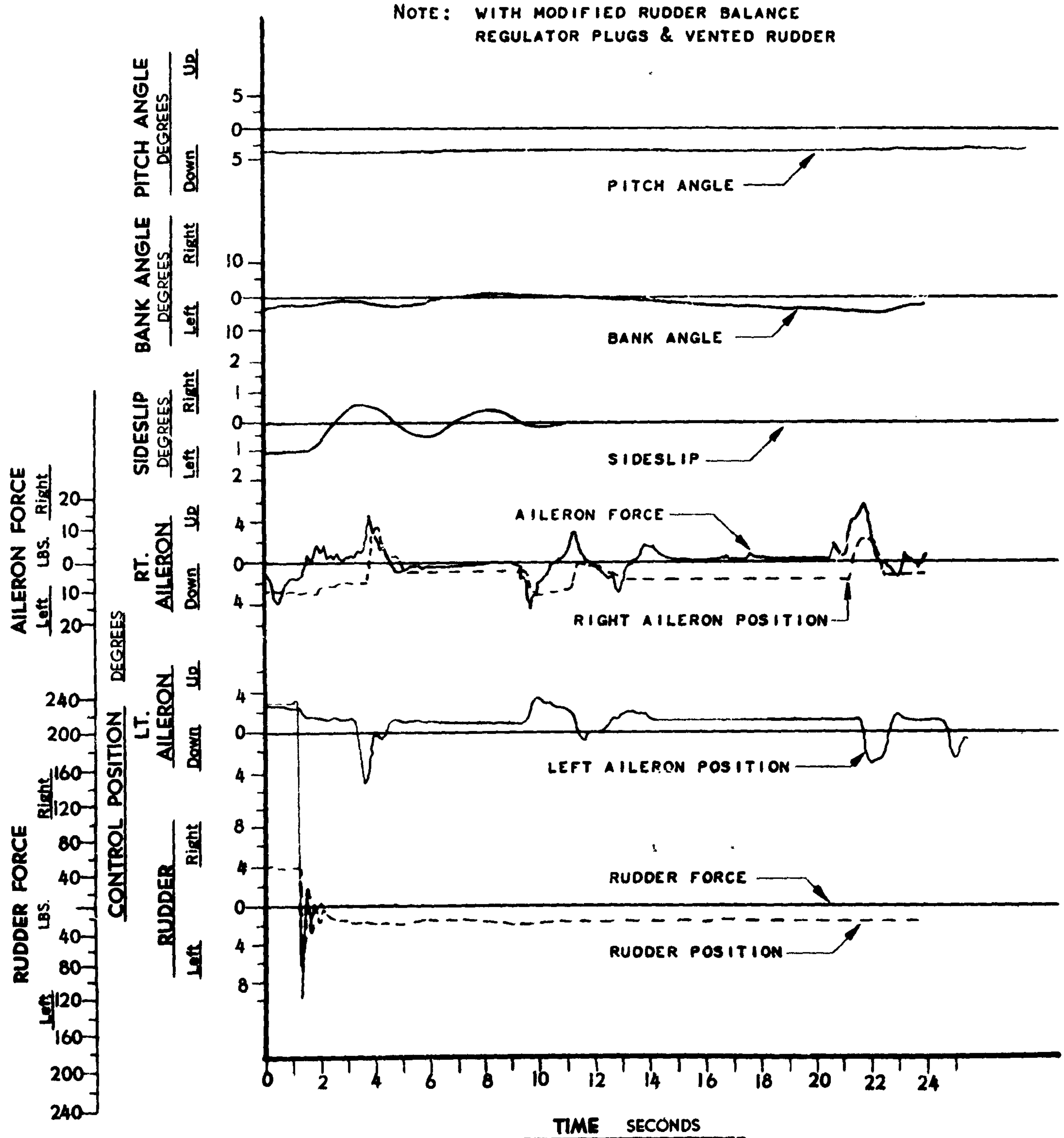


FIGURE NO. 363

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION ; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	300	KNOTS ;	ALTITUDE	30,700	FEET
C.G.	19.0	% MAC;	WEIGHT	260,000	LBS.
RUDDER TAB	1.5 DEG.	T.E. LT. ;	L. AIL. TAB	1.2 DEG.	T. E. UP
AVG. N_2	8560	RPM;	R. AIL. TAB.	2.0 DEG.	T. E. DN.

EXTERNAL TANKS INSTALLED

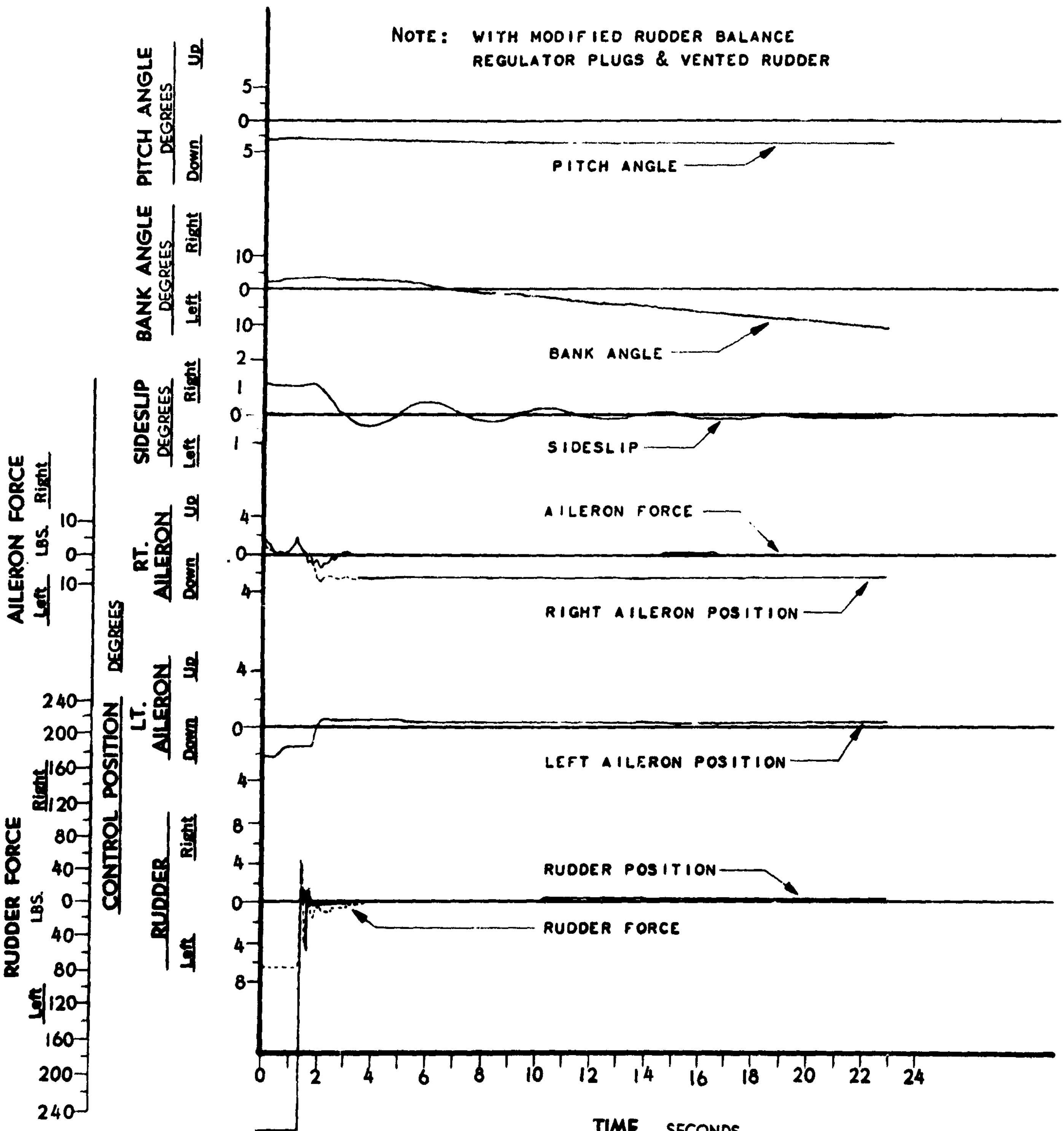


FIGURE NO.364

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION ; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	300	KNOTS ;	ALTITUDE	30,700	FEET
C.G.	19.0	% MAC;	WEIGHT	260,000	LBS.
RUDDER TAB	1.5 DEG.	T.E. LT.;	L. AIL. TAB	1.2 DEG.	T. E. UP
AVG. N2	8560	RPM;	R. AIL. TAB.	2.0 DEG.	T. E. DN.

EXTERNAL TANKS INSTALLED

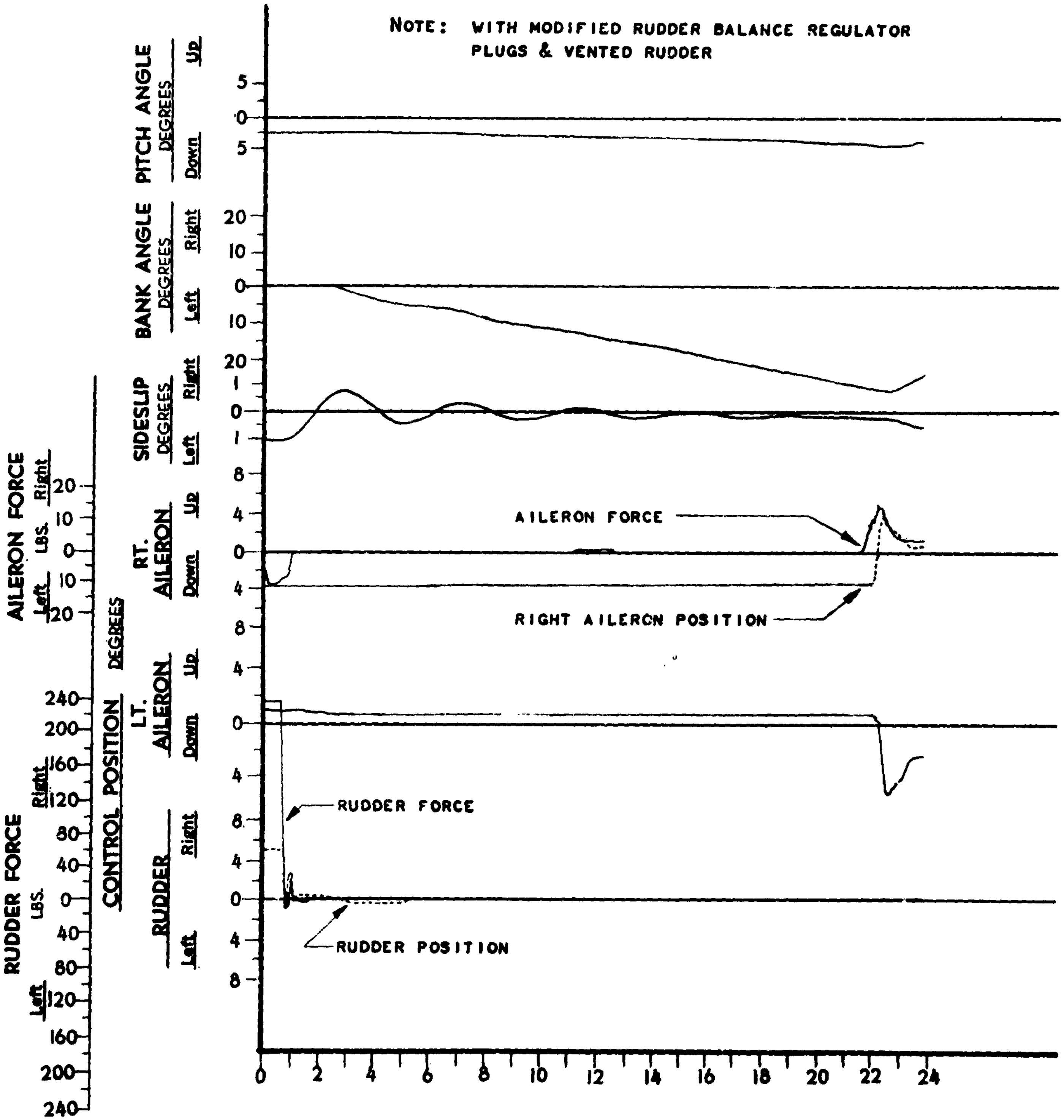


FIGURE NO. 365

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	299.5	KNOTS;	ALTITUDE	30,200	FEET
C.G.	32.2	% MAC;	WEIGHT	275000	LBS.
RUDDER TAB	0.4 DEG.	T. E. RT;	L. AIL. TAB	1.2 DEG.	T. E. DN.
AVG. N_2	8520	RPM;	R. AIL. TAB.	0.2 DEG.	T. E. UP

EXTERNAL TANKS INSTALLED

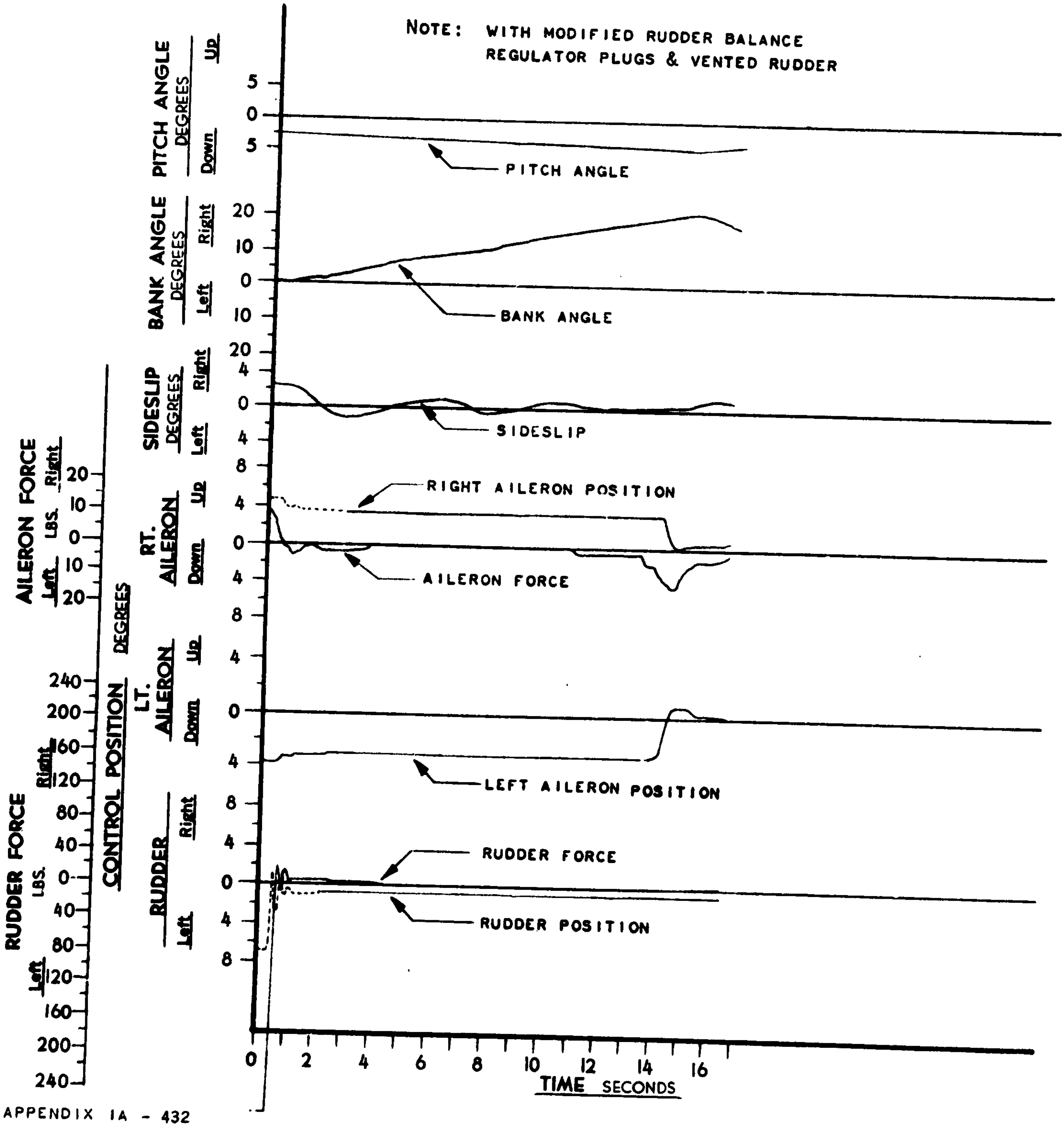


FIGURE NO. 366

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	299.5	KNOTS;	ALTITUDE	30,200	FEET
C.G.	32.2	% MAC;	WEIGHT	275000	LBS.
RUDDER TAB	0.4	DEG. T.E. RT;	L. AIL. TAB	1.2	DEG. T. E. DN.
AVG. N2	8520	RPM;	R. AIL. TAB.	0.2	DEG. T. E. UP

EXTERNAL TANKS INSTALLED

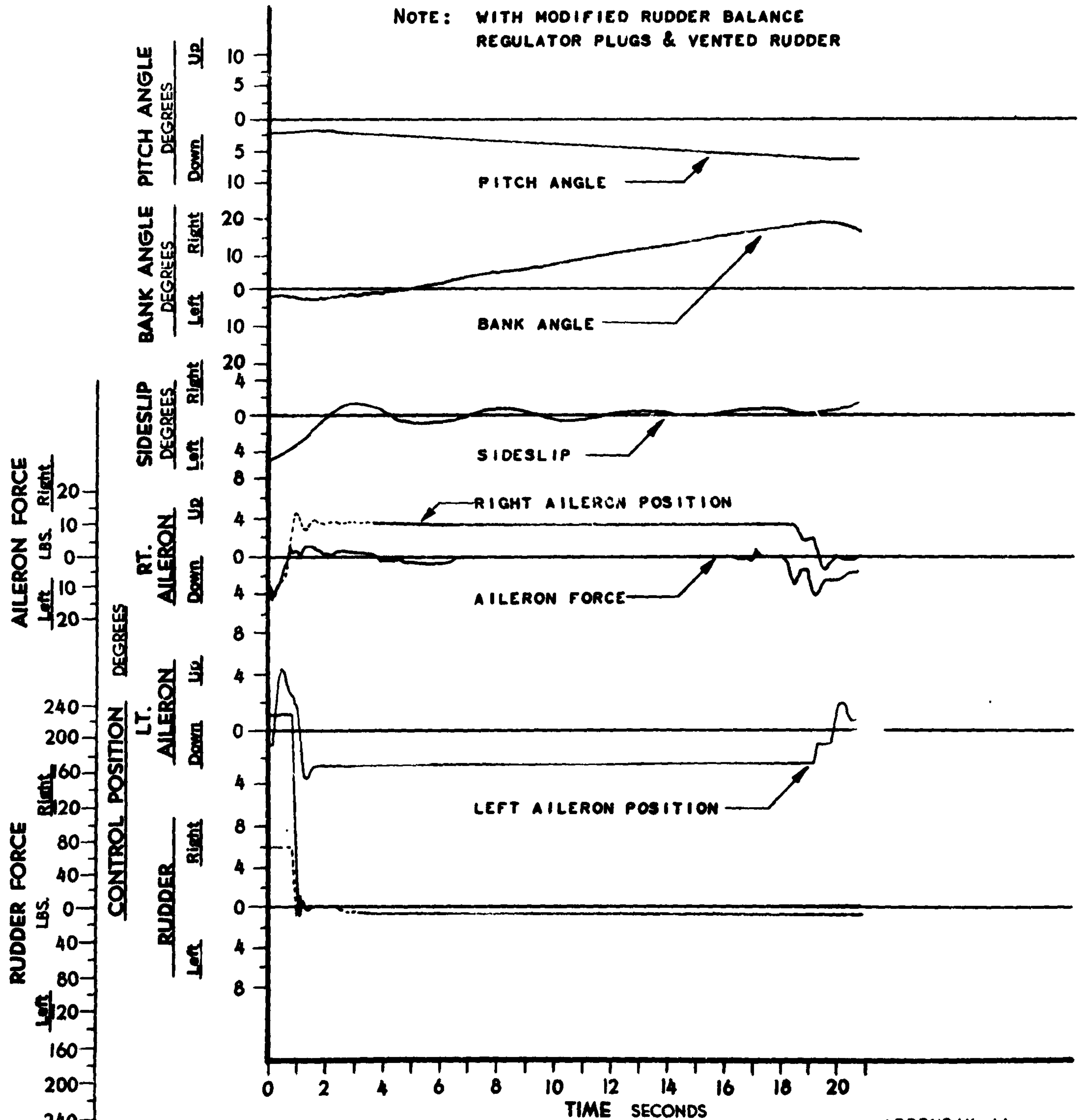


FIGURE NO. 367

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	180.5	KNOTS;	ALTITUDE	46,800	FEET
C.G.	17.0	% MAC;	WEIGHT	253,600	LBS.
RUDDER TAB	3.0	DEG. T.E.LT.;	L. AIL. TAB	0.7 DEG.	T. E. UP
AVG. N_2	8810	RPM;	R. AIL. TAB.	1.0 DEG.	T. E. DN.

NO EXTERNAL TANKS INSTALLED

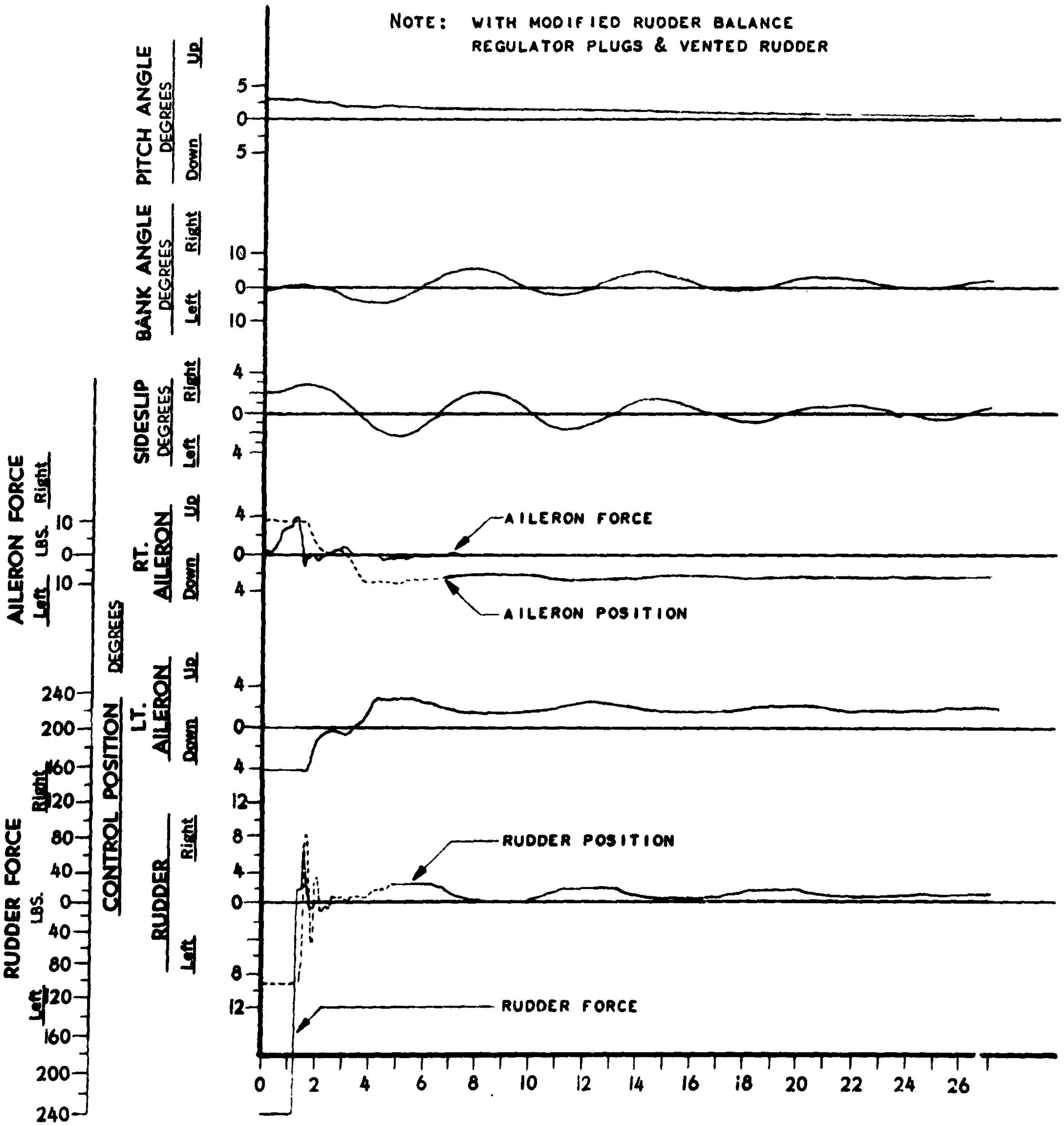


FIGURE NO. 368

AFFTC-TR-55-27

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	180.5 KNOTS;	ALTITUDE	46,800	FEET	
C.G.	17.0 % MAC;	WEIGHT	253,600	LBS.	
RUDDER TAB	3.0 DEG. T.E. LT.;	L. AIL. TAB	0.7	DEG. T. E. UP	
AVG. N_2	8810 RPM;	R. AIL. TAB.	1.0	DEG. T. E. DN.	

NO EXTERNAL TANKS INSTALLED

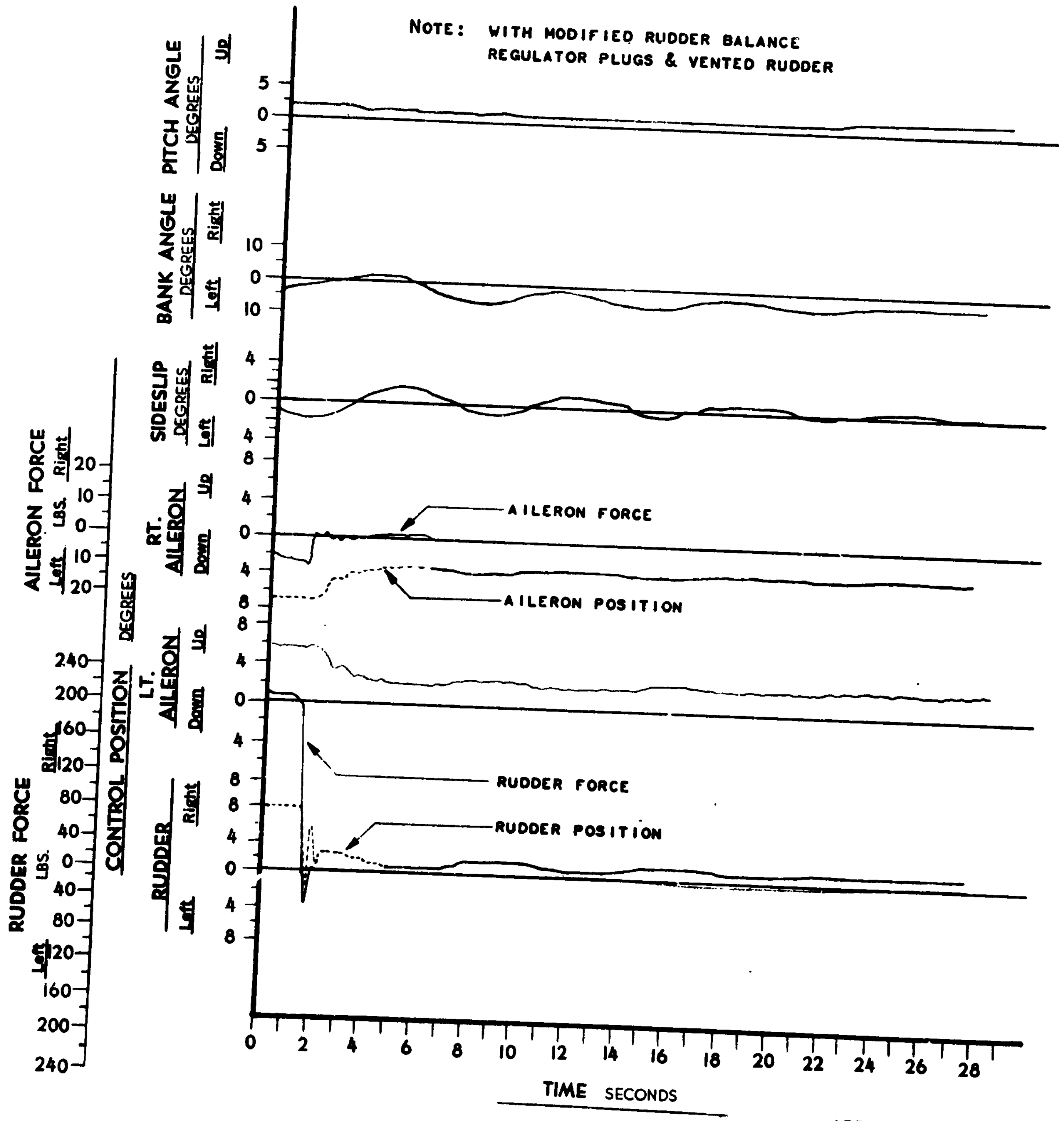


FIGURE NO. 369

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	207.5	KNOTS ;	ALTITUDE	46,800	FEET
C.G.	18.3	% MAC;	WEIGHT	256,000	LBS.
RUDDER TAB	3.3 DEG.	T.E. LT;	L. AIL. TAB	0.4 DEG.	T. E. UP
AVG. N_2	8920	RPM;	R. AIL. TAB.	0.7 DEG.	T. E. DN.

NO EXTERNAL TANKS INSTALLED

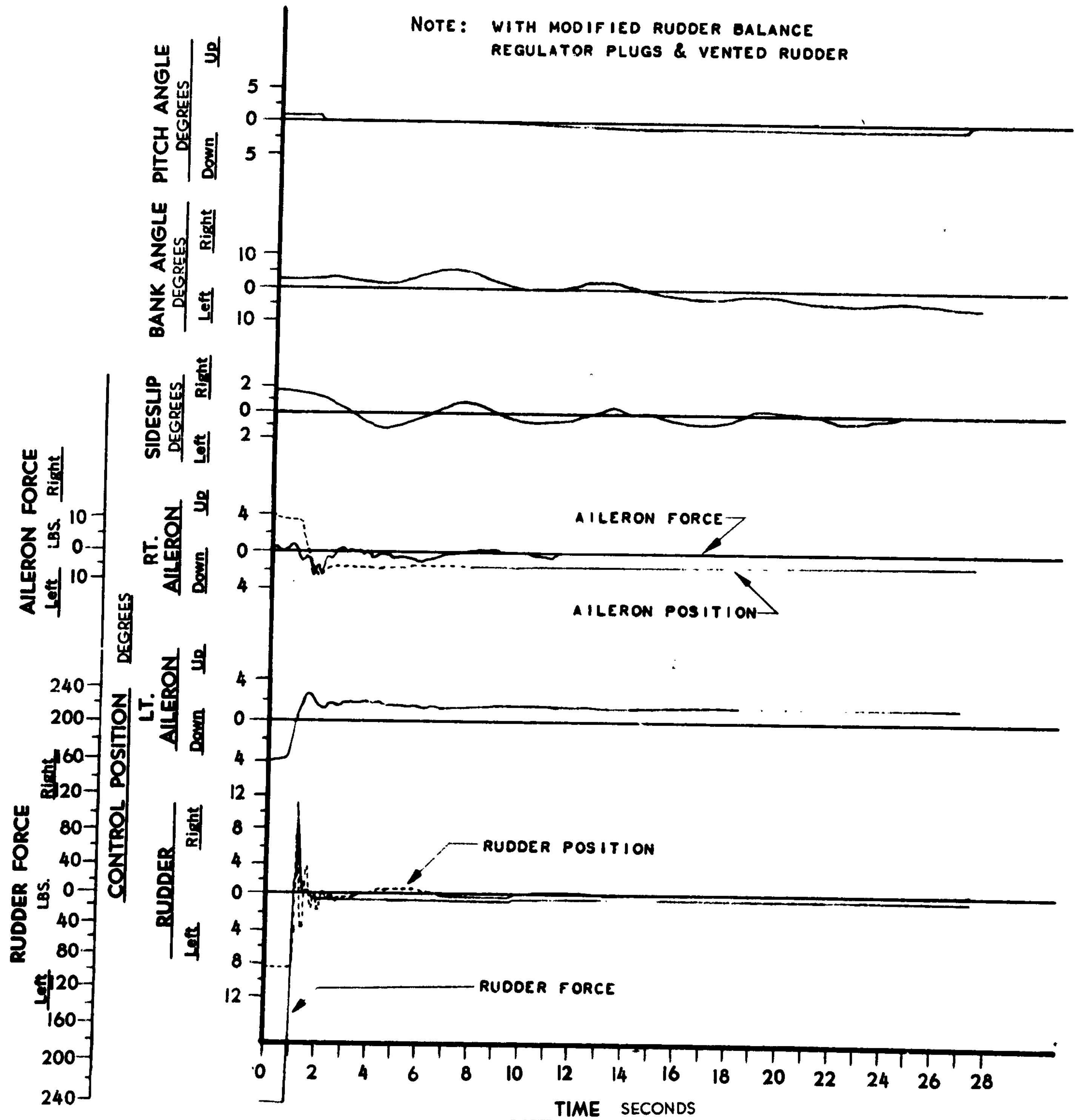


FIGURE NO. 370

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	207.5	KNOTS;	ALTITUDE	46,800	FEET
C.G.	18.3	% MAC;	WEIGHT	256,000	LBS.
RUDDER TAB	3.3	DEG. T.E. LT.;	L. AIL. TAB	0.4	DEG. T. E. UP.
AVG. N_2	8920	RPM;	R. AIL. TAB.	0.7	DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: WITH MODIFIED RUDDER BALANCE REGULATOR PLUGS & VENTED RUDDER

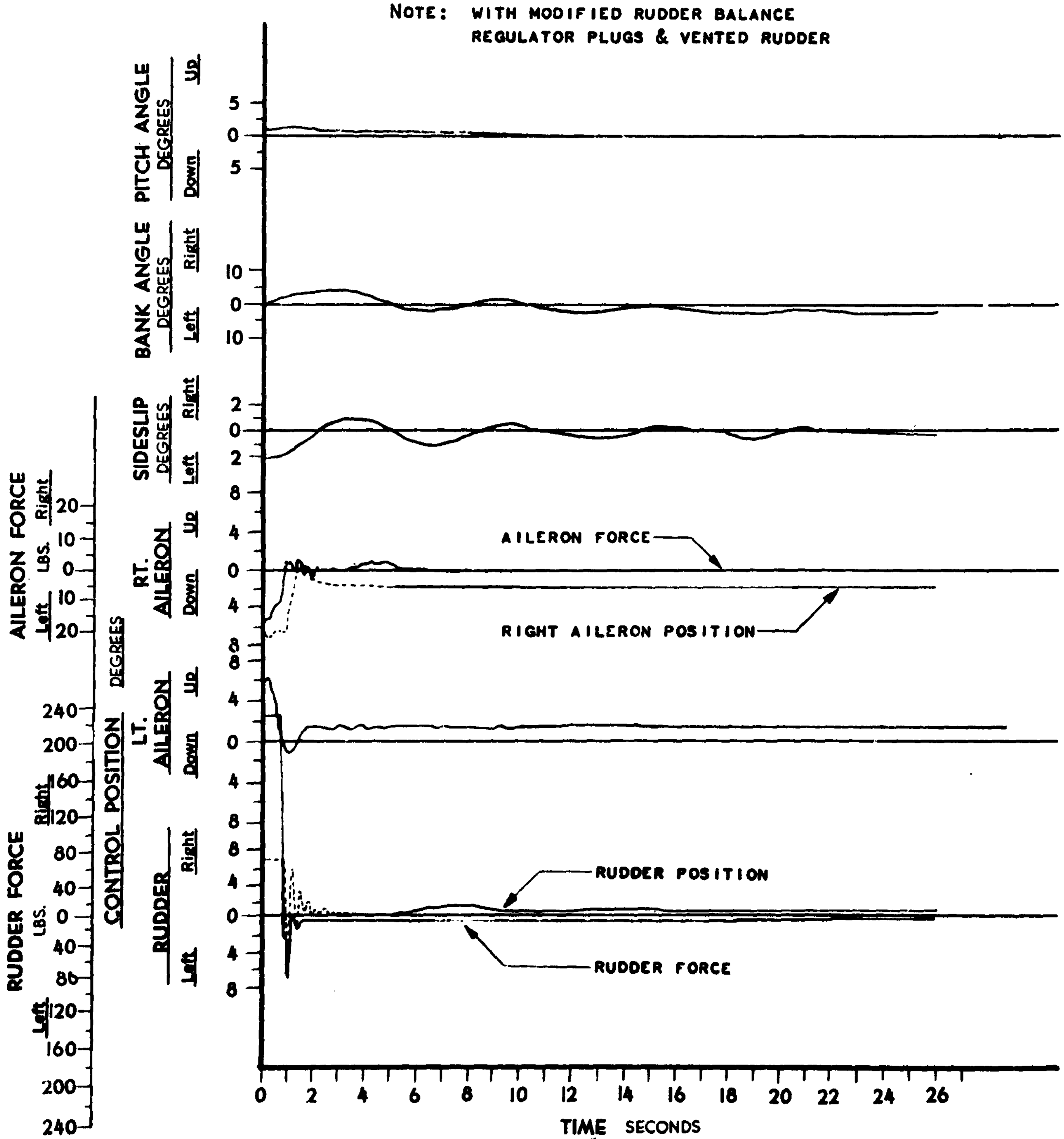


FIGURE NO. 371

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

POWER CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	220.5	KNOTS;	ALTITUDE	46,700	FEET
C.G.	19.1	% MAC;	WEIGHT	258,500	LBS.
RUDDER TAB	3.3 DEG.	T. E. LT;	L. AIL. TAB	0.5 DEG.	T. E. DN.
AVG. N_2	9170	RPM;	R. AIL. TAB.	0.5 DEG.	T. E. DN.

NO EXTERNAL TANKS INSTALLED

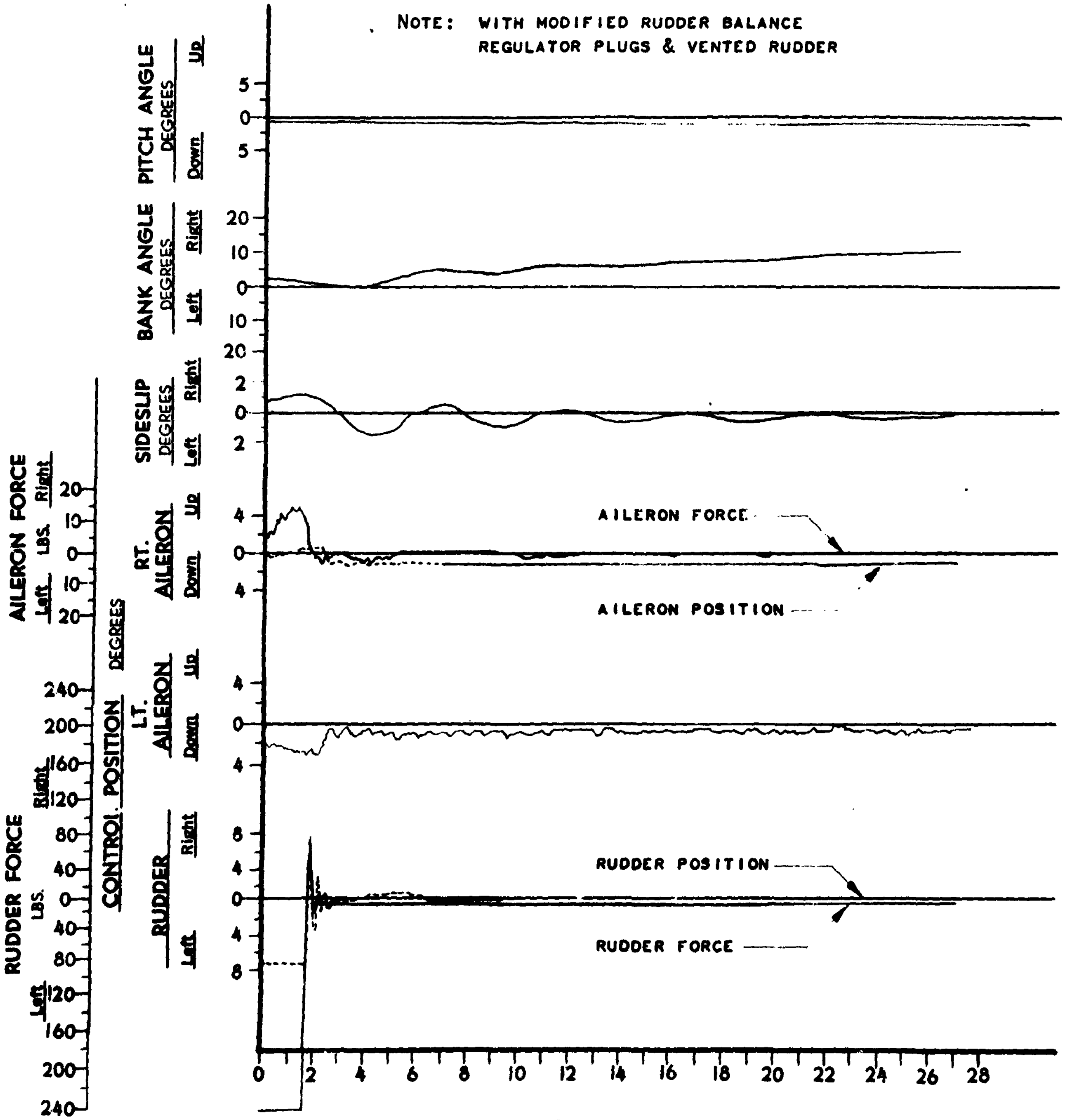


FIGURE NO. 372

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

POWER CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	220.5	KNOTS;	ALTITUDE	46,700	FEET
C.G.	19.1	% MAC;	WEIGHT	258,500	LBS.
RUDDER TAB	3.3	DEG. T.E. LT.;	L. AIL. TAB	0.5	DEG. T. E. DN.
AVG. N2	9170	RPM;	R. AIL. TAB.	0.5	DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: WITH MODIFIED RUDDER BALANCE REGULATOR PLUGS & VENTED RUDDER

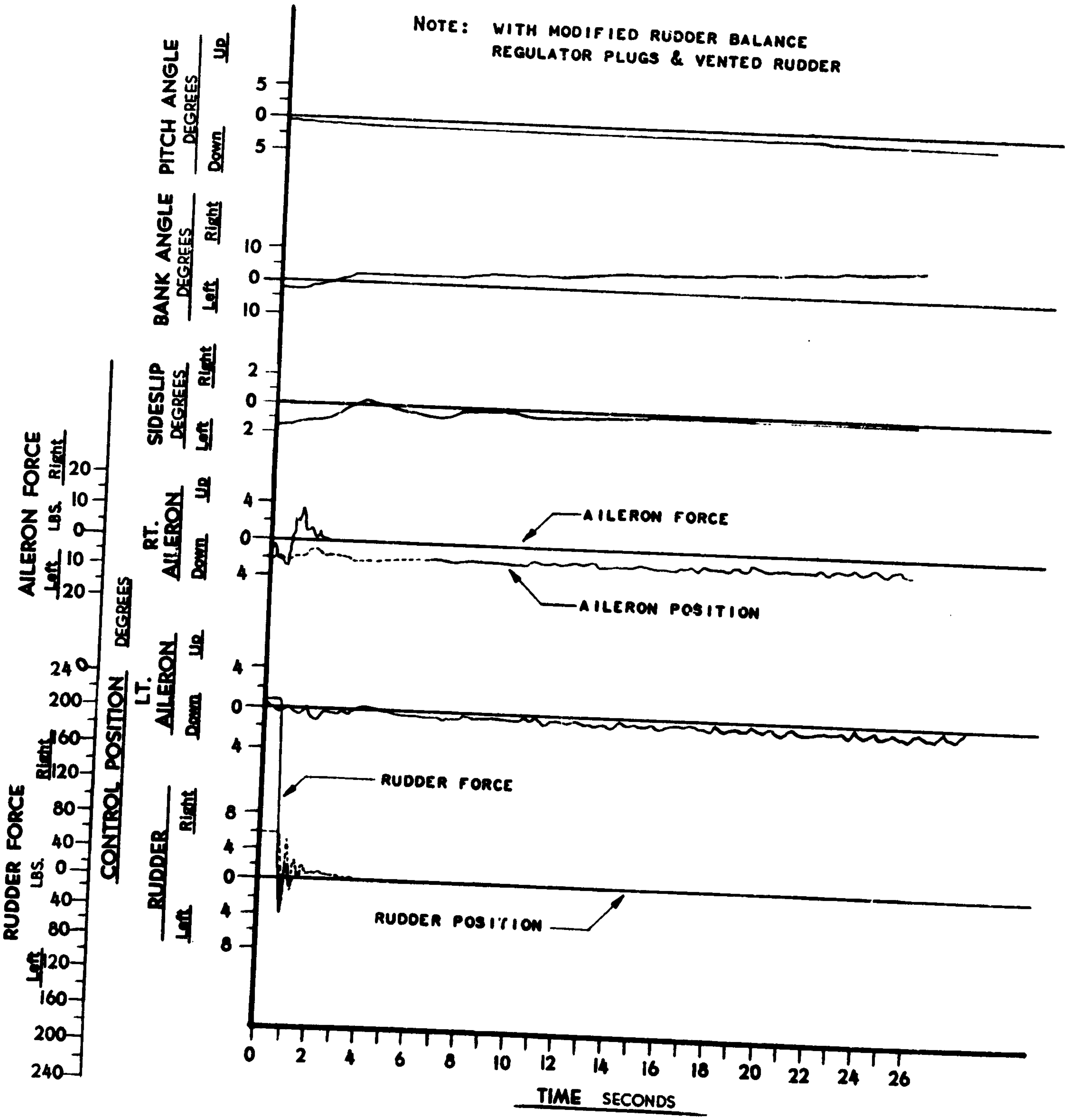


FIGURE NO. 373

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	202.5	KNOTS ;	ALTITUDE	47,900	FEET
C.G.	18.4	% MAC;	WEIGHT	253,000	LBS.
RUDDER TAB 3.3 DEG. T.E. LT.;			L. AIL. TAB 0.4 DEG. T. E. UP		
AVG. N_2	8950	RPM;	R. AIL. TAB. 1.5 DEG. T. E. DN.		

EXTERNAL TANKS INSTALLED

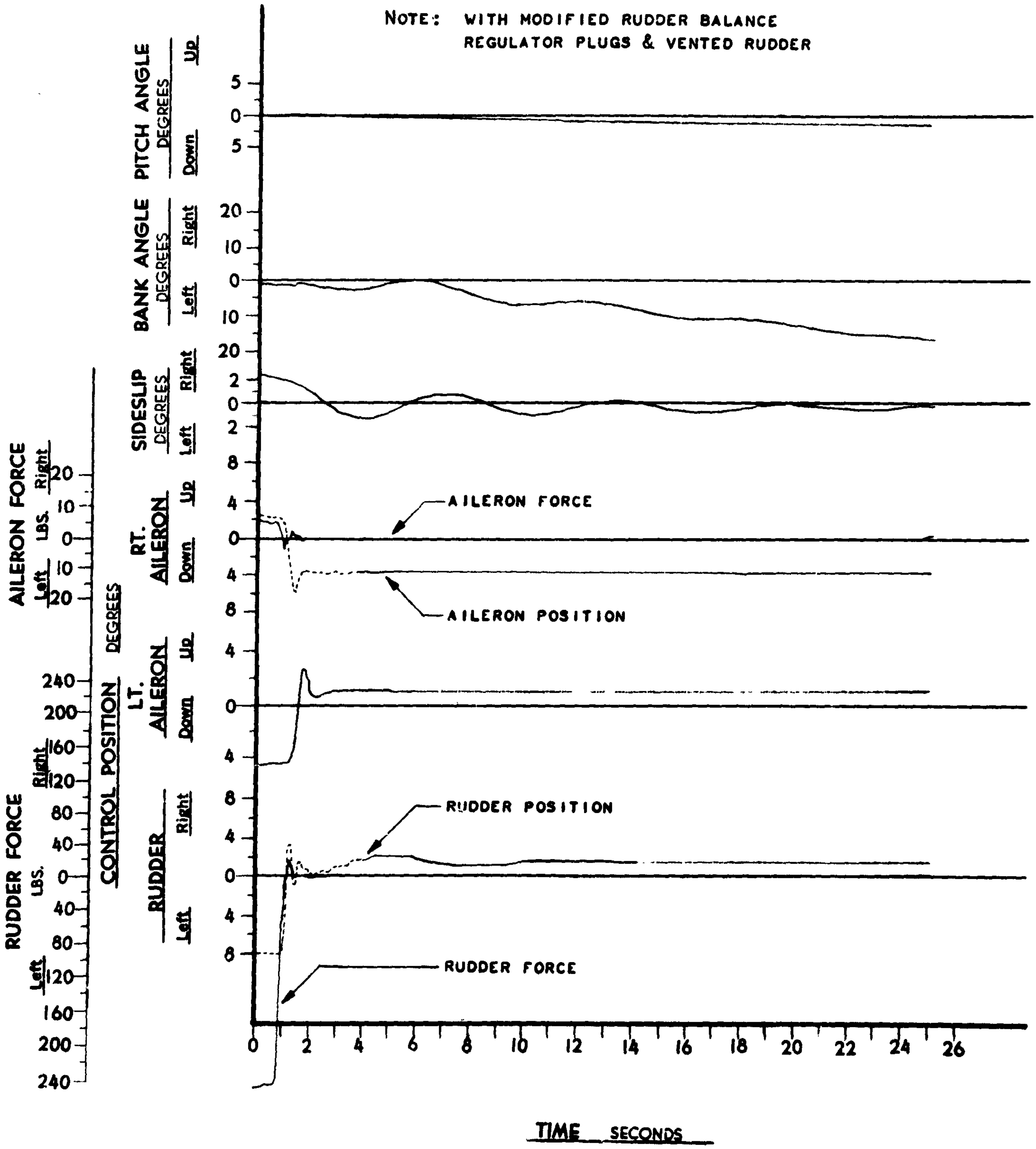


FIGURE NO. 374

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	202.5	KNOTS;	ALTITUDE	47,900	FEET
C.G.	18.4	% MAC;	WEIGHT	253,000	LBS.
RUDDER TAB	3.3	DEG. T.E. LT.;	L. AIL. TAB	0.4 DEG.	T. E. UP
AVG. N2	8950	RPM;	R. AIL. TAB.	1.5 DEG.	T. E. DN.

EXTERNAL TANKS INSTALLED

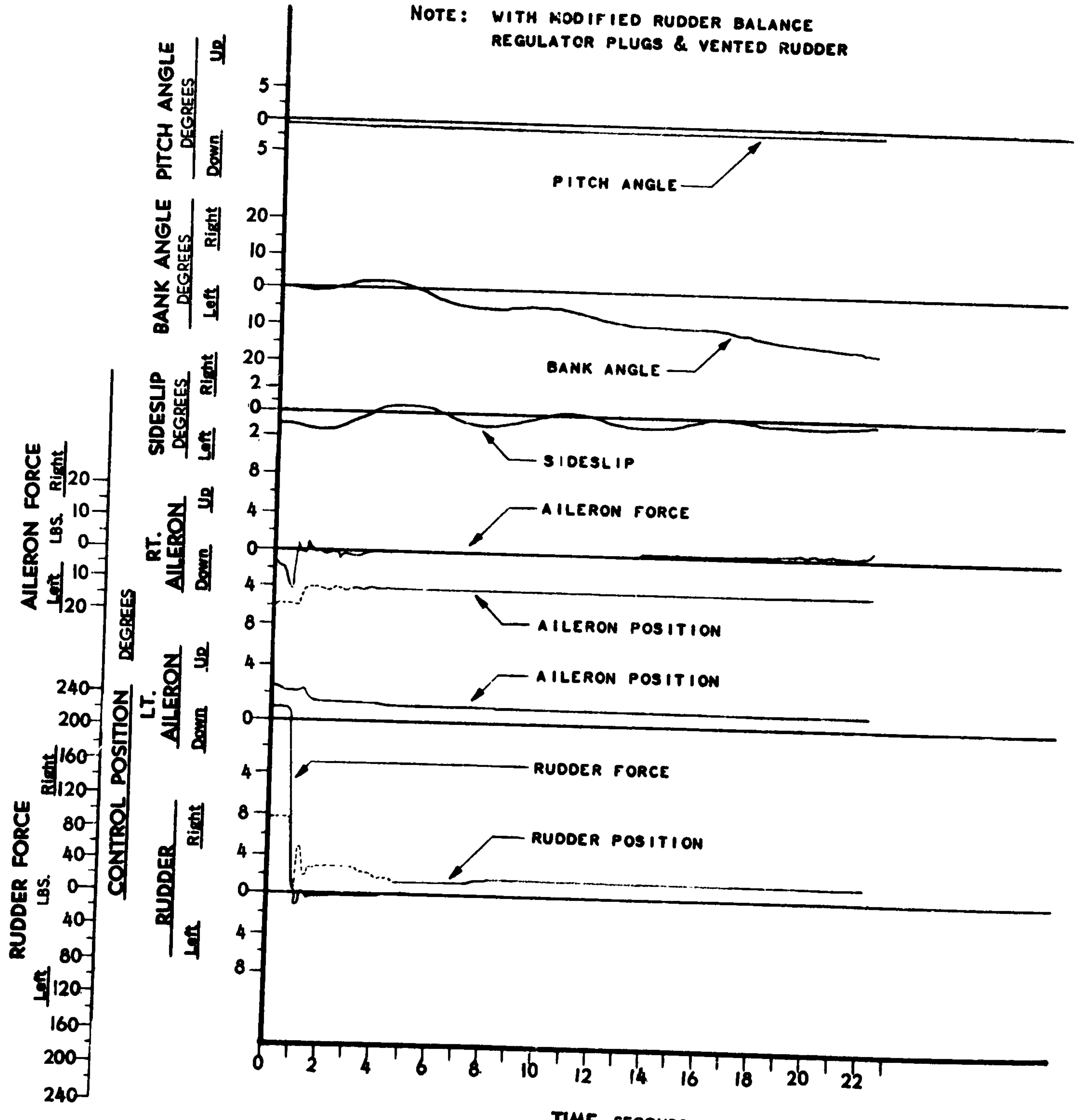


FIGURE NO. 375

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	201.5	KNOTS :	ALTITUDE	48,100	FEET
C.G.	33.5	% MAC;	WEIGHT	265,500	LBS.
RUDDER TAB	2.1 DEG.	T.E. RT.;	L. AIL. TAB	0.4 DEG.	T. E. UP
AVG. N_2	9130	RPM;	R. AIL. TAB.	1.5 DEG.	T. E. DN.

EXTERNAL TANKS INSTALLED

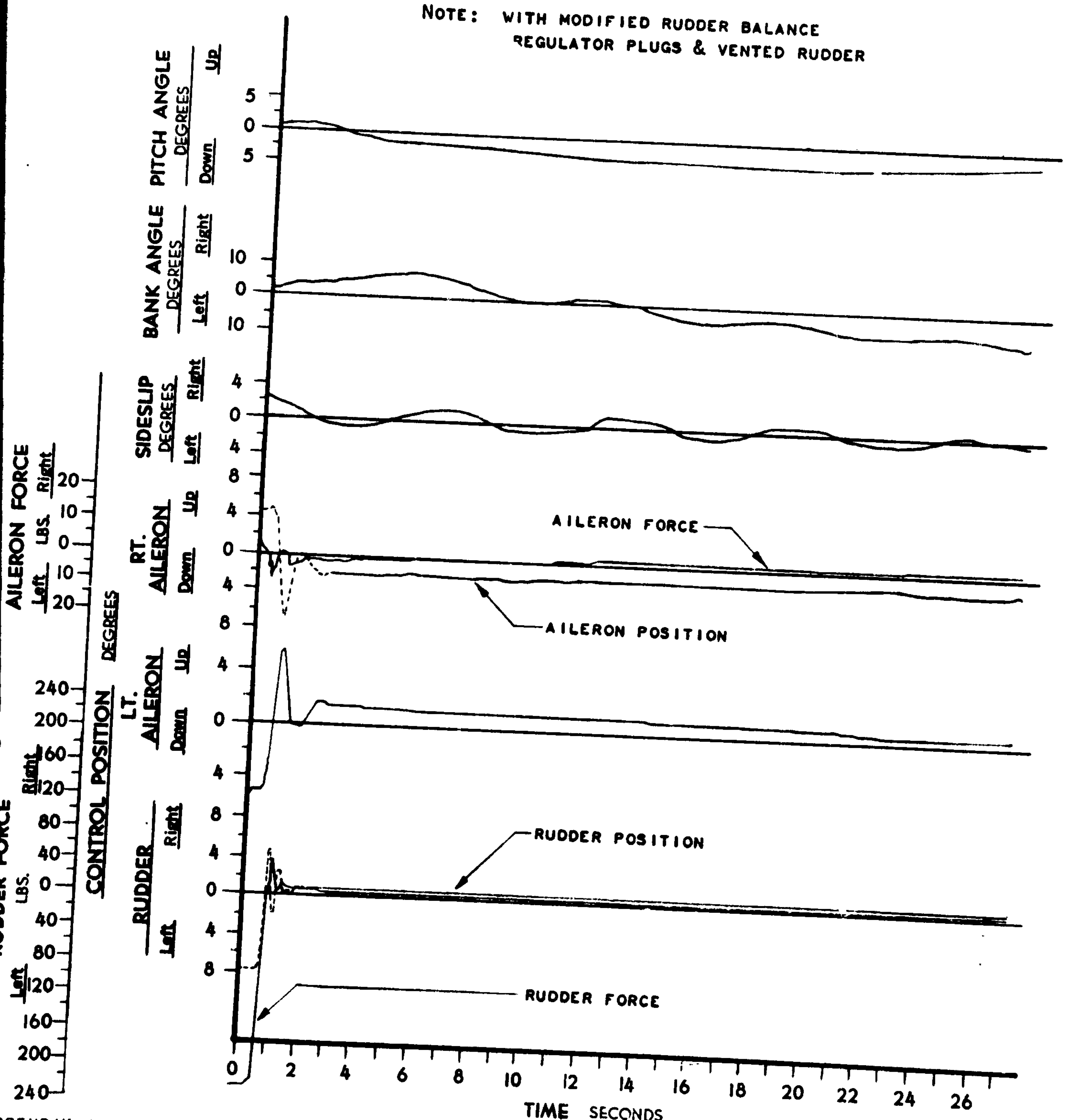


FIGURE NO. 376

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	201.5	KNOTS;	ALTITUDE	48,100	FEET
C.G.	33.5	% MAC;	WEIGHT	265,500	LBS.
RUDDER TAB	2.1 DEG.	T.E. RT.;	L. AIL. TAB	0.4 DEG.	T. E. UP
AVG. N_2	9130	RPM;	R. AIL. TAB.	1.5 DEG.	T. E. DN.

EXTERNAL TANKS INSTALLED

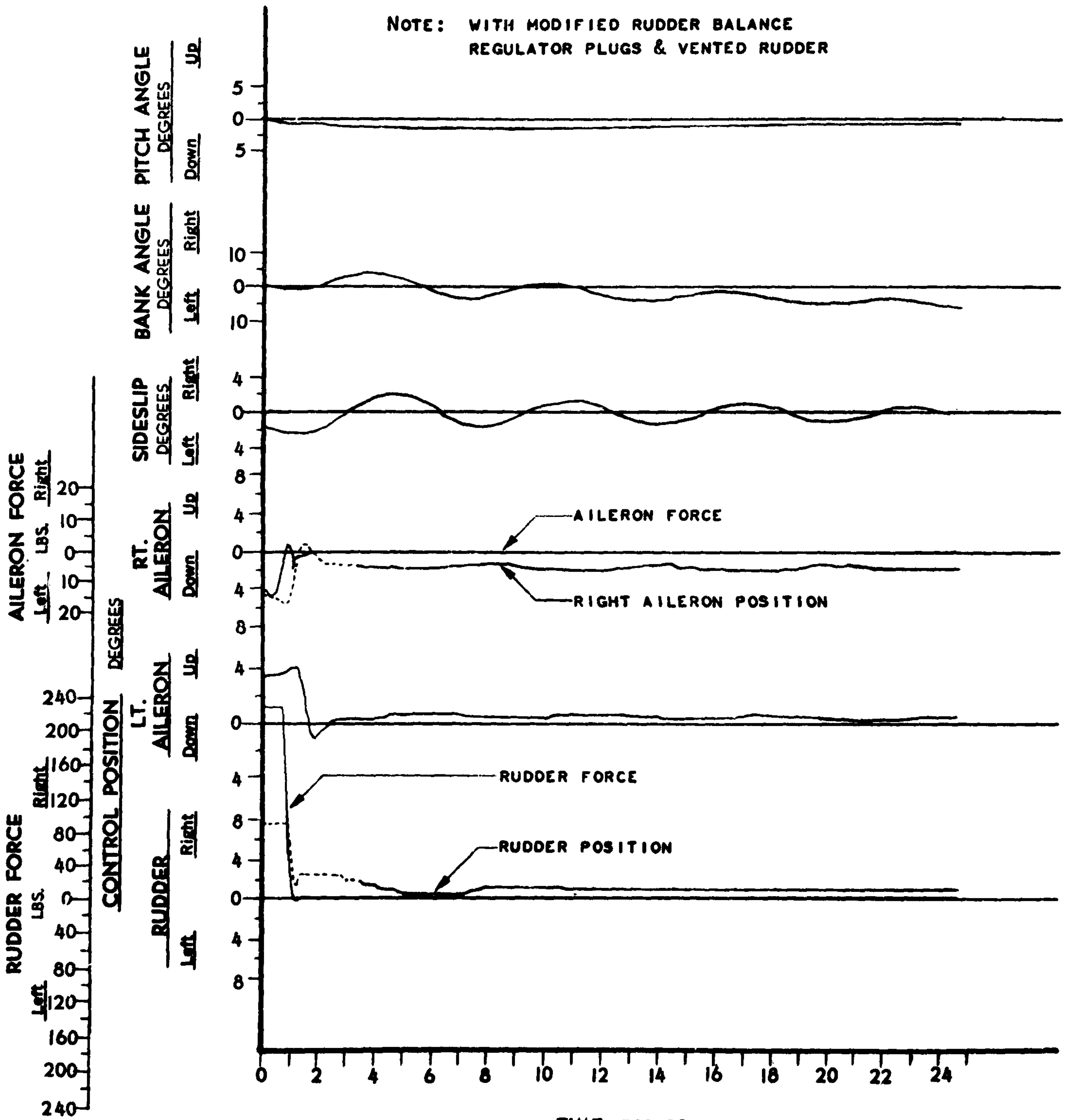


FIGURE NO. 377

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	173.5	KNOTS ;	ALTITUDE	47,700	FEET
C.G.	34.0	% MAC;	WEIGHT	226,500	LBS.
RUDDER	TAB 2.4 DEG.	T.E. LT.;	L. AIL. TAB	0.4 DEG.	T. E. UP
AVG. N2	8730	RPM;	R. AIL. TAB.	0.5 DEG.	T. E. DN.

BOMB BAY DOORS OPEN

NO EXTERNAL TANKS INSTALLED

NOTE: WITH MODIFIED RUDDER BALANCE REGULATOR PLUGS & VENTED RUDDER

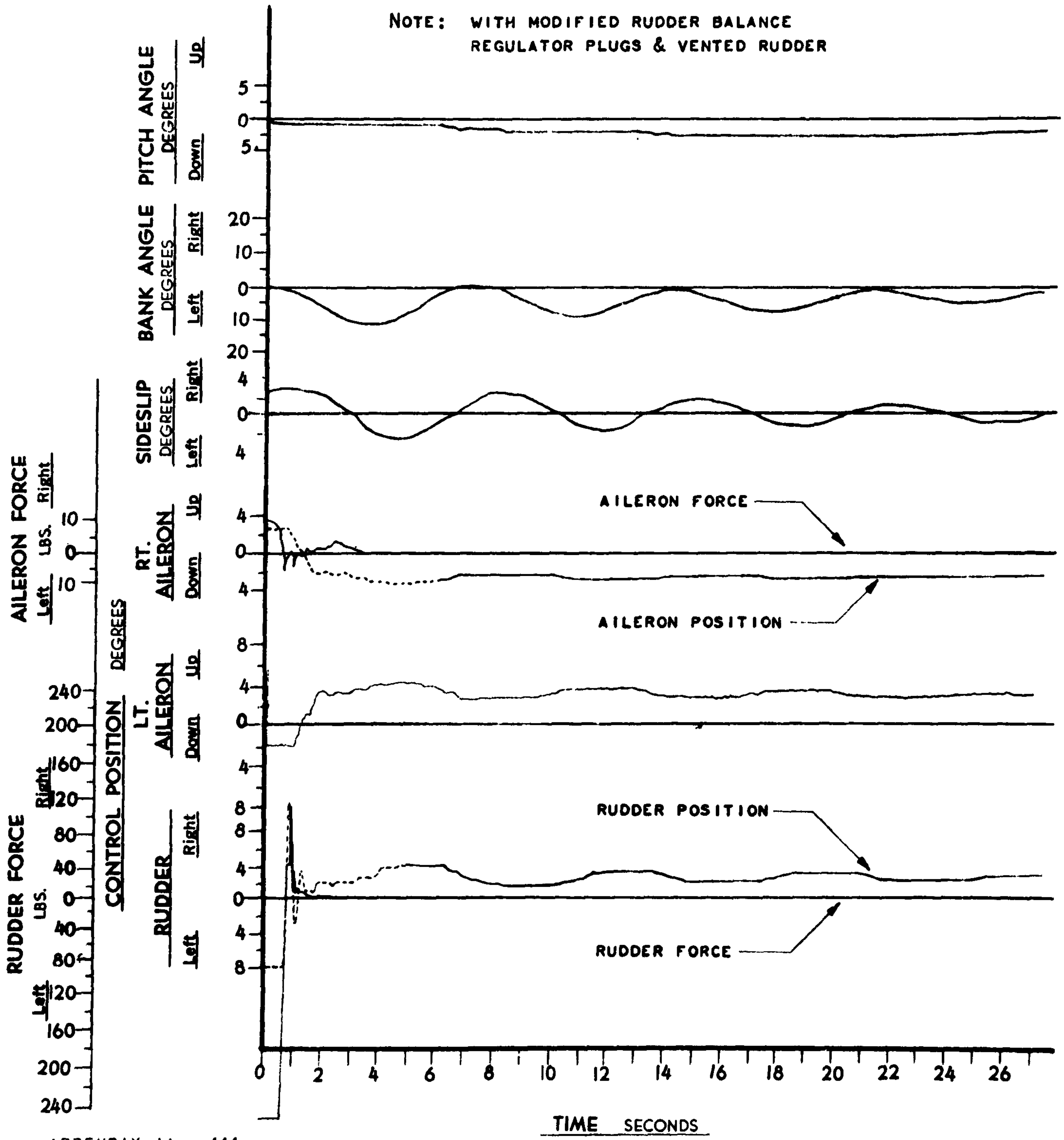


FIGURE NO. 378

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S. 173.5	KNOTS;	ALTITUDE	47,700	FEET	
C.G. 34.0	% MAC;	WEIGHT	226,500	LBS.	
RUDDER TAB 2.4 DEG.	T.E. LT.;	L. AIL. TAB	0.4 DEG.	T. E. UP	
AVG. N_2 8730	RPM;	R. AIL. TAB.	0.5 DEG.	T. E. DN.	

BOMB BAY DOORS OPEN

NO EXTERNAL TANKS INSTALLED

NOTE: WITH MODIFIED RUDDER BALANCE REGULATOR PLUGS & VENTED RUDDER

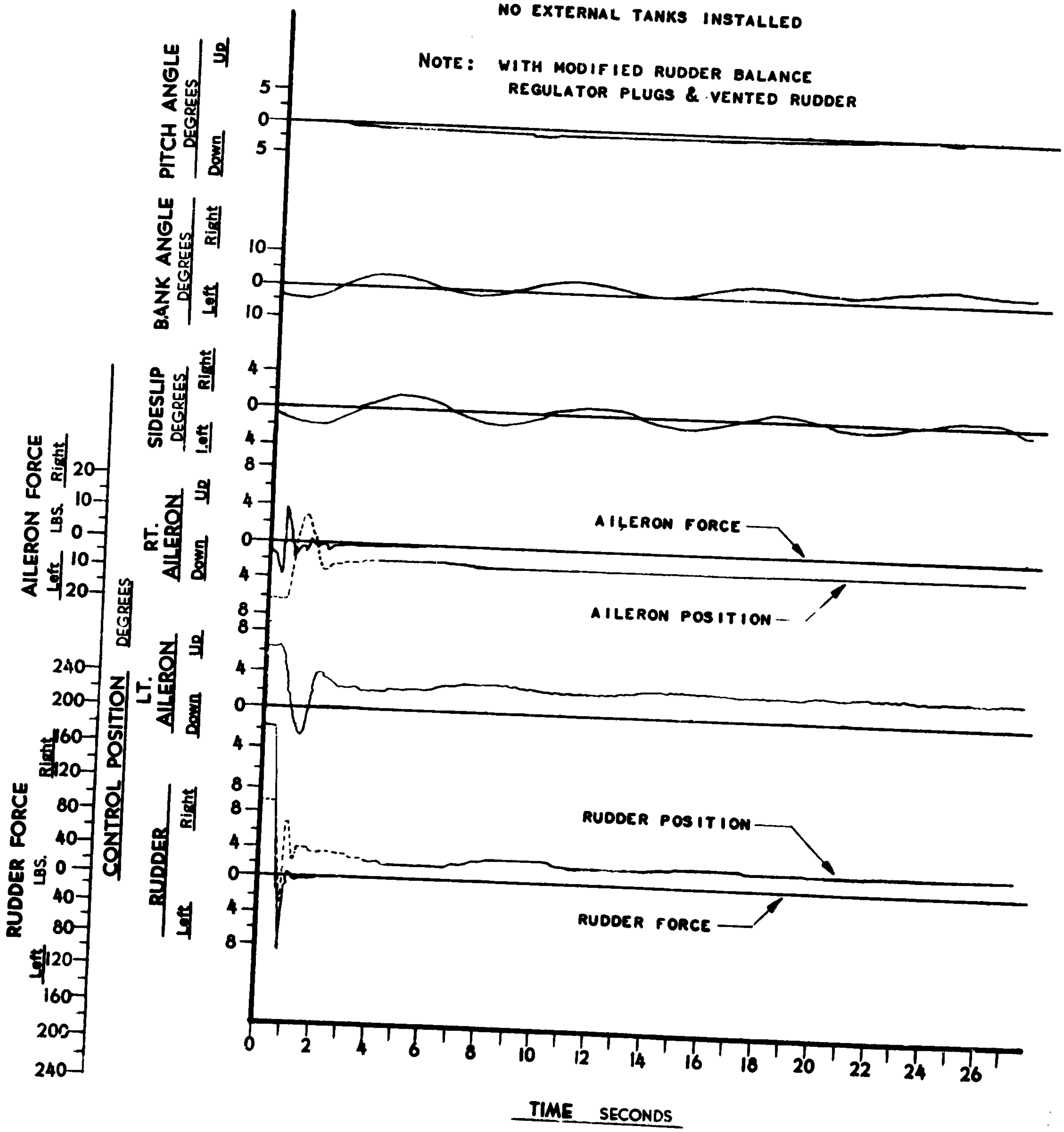


FIGURE NO. 379

DYNAMIC LATERAL DIRECTIONAL STABILITY
B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	198.5	KNOTS;	ALTITUDE	47,700	FEET
C.G.	34.3	% MAC;	WEIGHT	228,000	LBS.
RUDDER	TAB 2.4	DEG. T.E. LT.;	L. AIL. TAB	1.2	DEG. T. E. UP
AVG. N2	8930	RPM;	R. AIL. TAB.	1.6	DEG. T. E. DN.

BOMB BAY DOORS OPEN

NO EXTERNAL TANKS INSTALLED

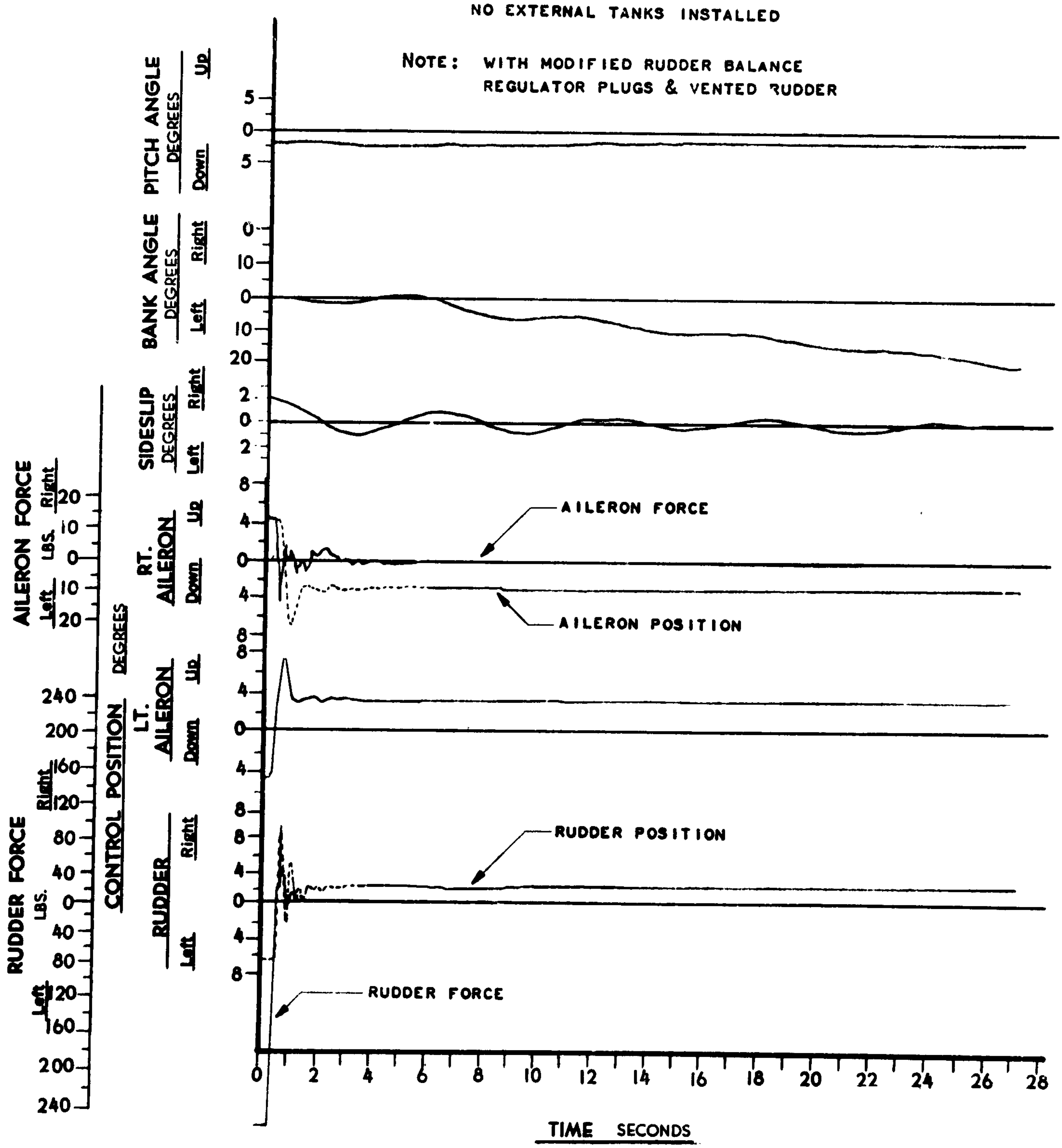


FIGURE NO. 380

DYNAMIC LATERAL DIRECTIONAL STABILITY
B-52A, USAF NO. 52-003

CRUISE CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	198.5	KNOTS ;	ALTITUDE	47,700	FEET
C.G.	34.3	% MAC;	WEIGHT	228,000	LBS.
RUDDER TAB	2.4	DEG. T.E. LT.;	L. AIL. TAB	1.2	DEG. T. E. UP
AVG. N2	8930	RPM;	R. AIL. TAB.	1.6	DEG. T. E. DN.

BOMB BAY DOORS OPEN

NO EXTERNAL TANKS INSTALLED

NOTE: WITH MODIFIED RUDDER BALANCE REGULATOR PLUGS & VENTED RUDDER

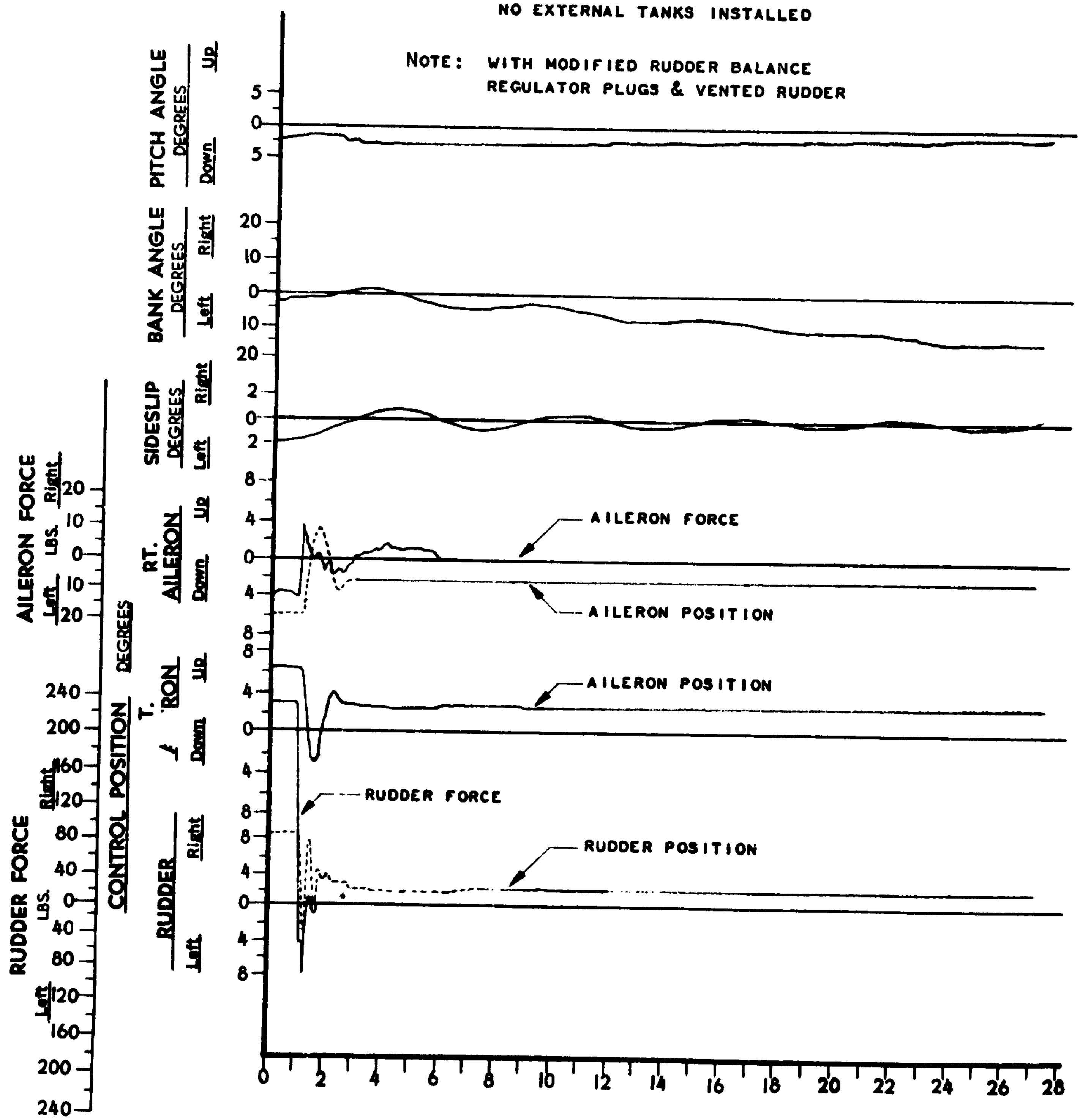


FIGURE NO. 381

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

POWER CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	215.5	KNOTS ;	ALTITUDE	47,700	FEET
C.G.	34.5	% MAC;	WEIGHT	230,000	LBS.
RUDDER TAB	2.7	DEG. T.E. LT.;	L. AIL. TAB	1.0	DEG. T. E. UP
AVG. N2	9100	RPM,	R. AIL. TAB.	1.3	DEG. T. E. DN.

BOMB BAY DOORS OPEN

NO EXTERNAL TANKS INSTALLED

NOTE: WITH MODIFIED RUDDER BALANCE REGULATOR PLUGS & VENTED RUDDER

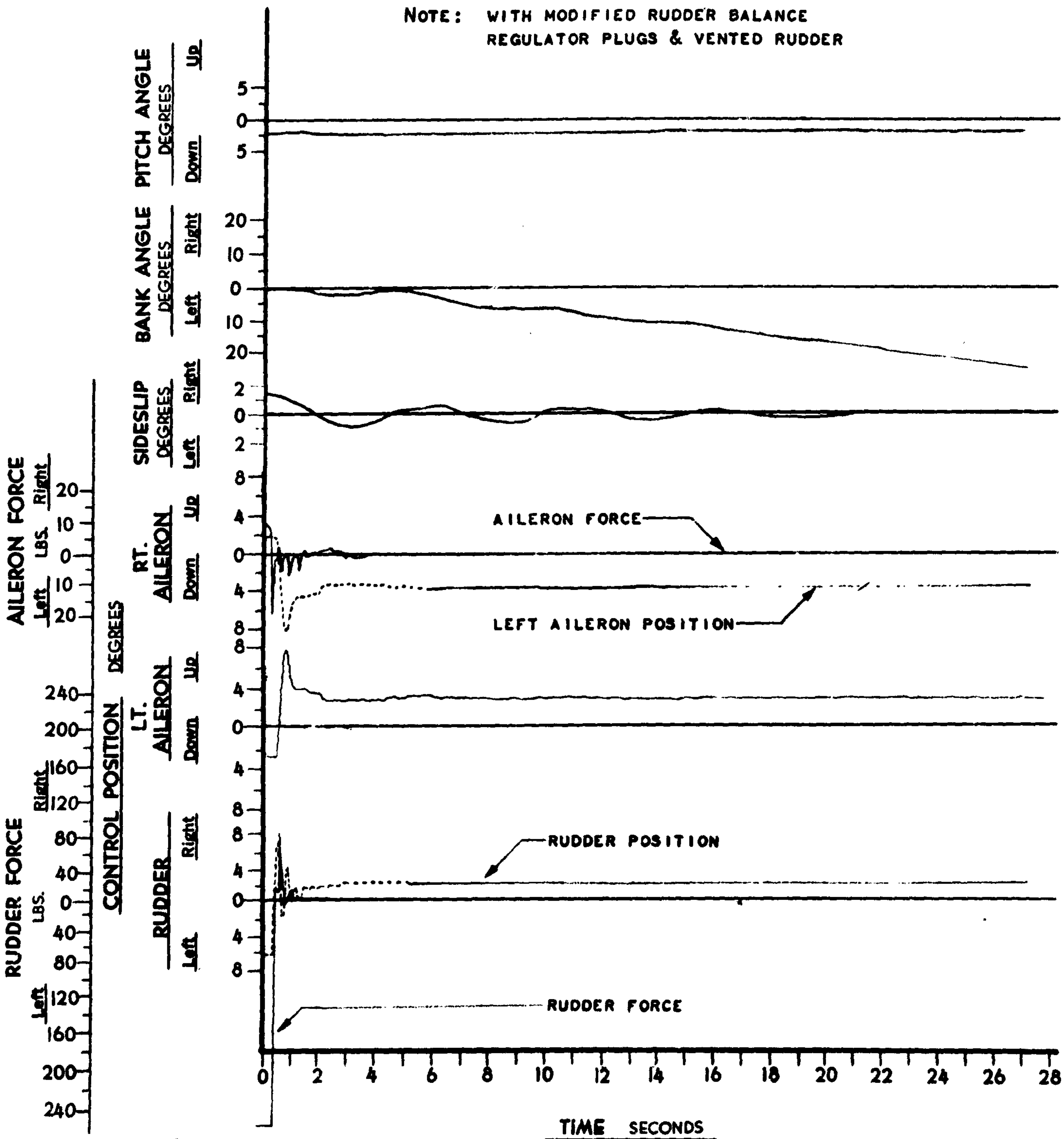


FIGURE NO. 382

DYNAMIC LATERAL DIRECTIONAL STABILITY

B-52A, USAF NO. 52-003

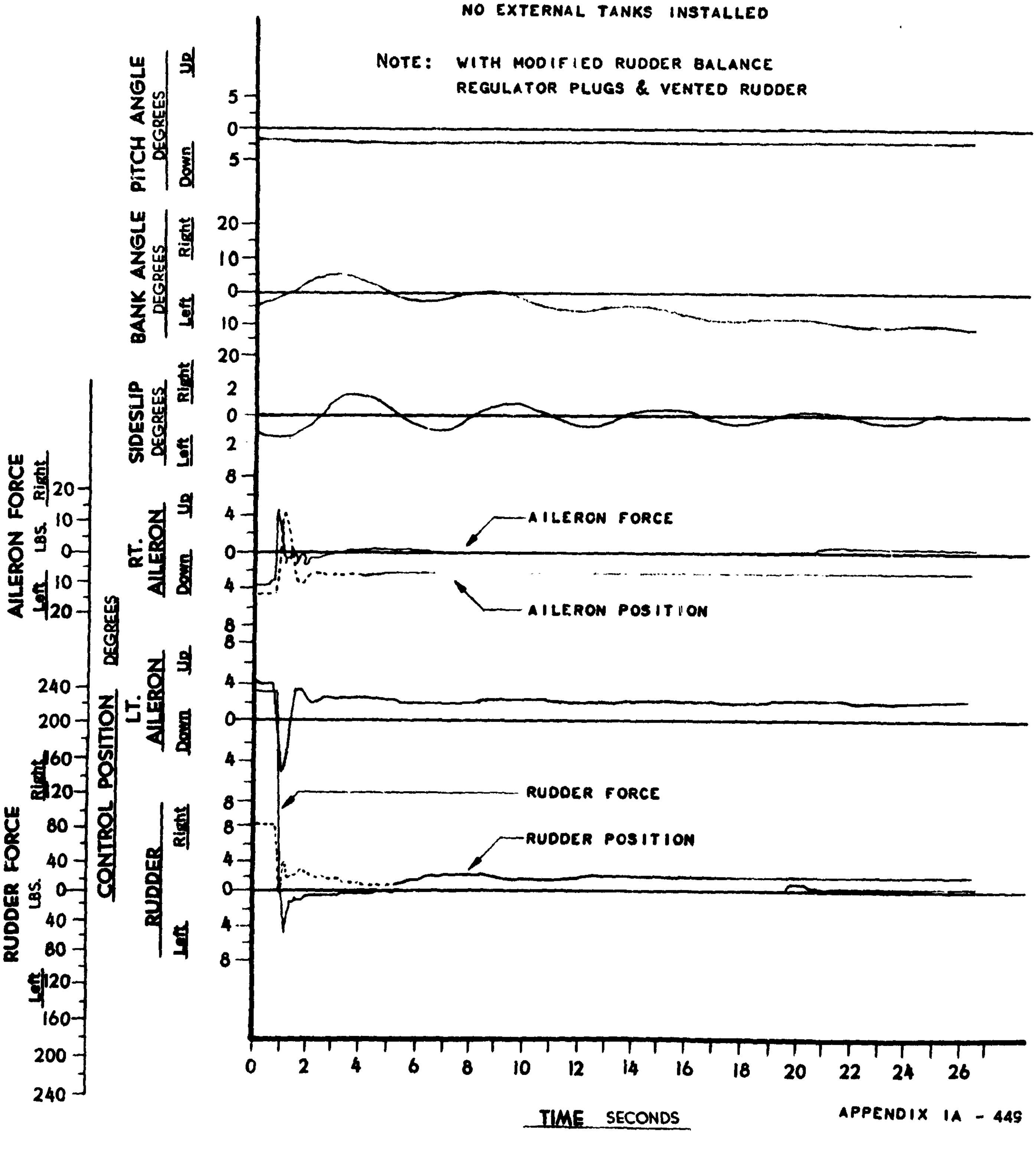
POWER CONFIGURATION; CONTROLS FIXED

TRIM CONDITIONS

C.A.S.	215.5	KNOTS;	ALTITUDE	47,700	FEET
C.G.	34.5	% MAC;	WEIGHT	230,000	LBS.
RUDDER TAB	2.7	DEG. T. E. LT.;	L. AIL. TAB	1.0	DEG. T. E. UP
AVG. N_2	9100	RPM;	R. AIL. TAB.	1.3	DEG. T. E. DN.

BOMB BAY DOORS OPEN

NO EXTERNAL TANKS INSTALLED



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FOR CONVENIENCE OF

PRESENTING PLOTS

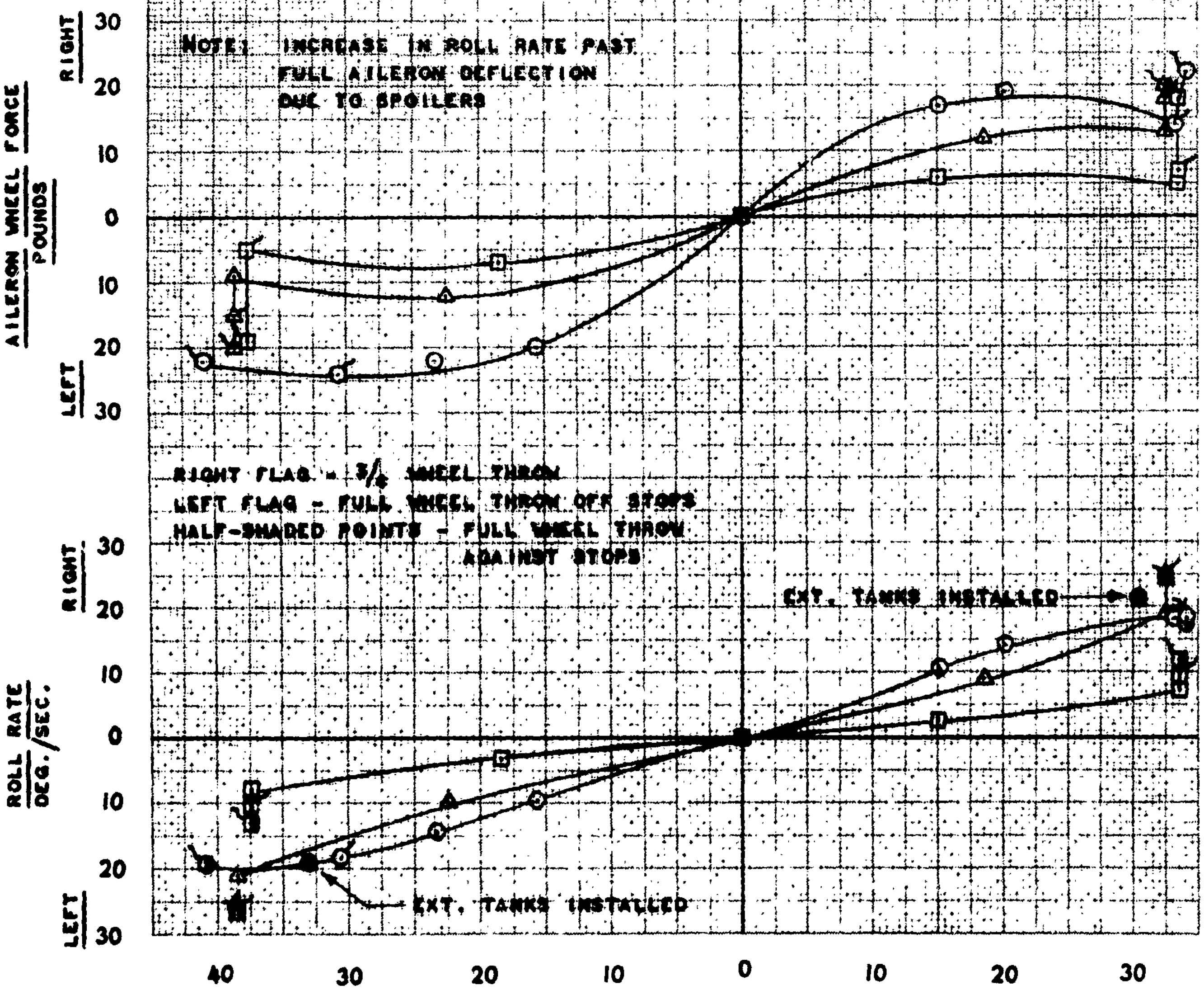
AILERON CHARACTERISTICS

FIGURE NO. 383
AILERON CHARACTERISTICS
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION
POWER FOR LEVEL FLIGHT

SPOILERS USED; RUDDER PEDALS FIXED
NO EXTERNAL TANKS INSTALLED EXCEPT AS NOTED

TRIM CONDITIONS

SYM.	AVG. N_2 RPM	C.A.S. KNOTS	ALT. FEET	GR. WT. POUNDS	C.G. % MAC	RUD. TAB. DEGREES	L. AIL. TAB. DEGREES	R. AIL. TAB. DEGREES
⊙	8570	350	20,300	254,000	24.4	0.7 T.E.RT	0.6 T.E.DN	0.8 T.E.DN
●	8690	346	20,[illegible]00	275,000	23.2	1.8 T.E.LT	0.2 T.E.DN	0.7 T.E.DN
▲	8430	251	20,500	245,000	26.6	1.5 T.E.LT	0.7 T.E.UP	0.9 T.E.DN
⊡	7680	160	21,500	243,000	26.6	1.5 T.E.LT	0.4 T.E.UP	0.9 T.E.DN



TOTAL AILERON DEFLECTION
DEGREES

FIGURE NO. 384
HELIX ANGLE (Pb/2V) vs AILERON DEFLECTION

B-52A, USAF NO. 52-003
CRUISE CONFIGURATION
POWER FOR LEVEL FLIGHT

SPOILERS USED: RUDDER PEDALS FIXED
NO EXTERNAL TANKS INSTALLED EXCEPT AS NOTED

TRIM CONDITIONS

SYM.	AVG. N_2 RPM	C.A.S. KNOTS	ALT. FEET	GR. WT. POUNDS	C.G. % MAC	RUD. TAB. DEGREES	L. AIL. TAB. DEGREES	R. AIL. TAB. DEGREES
⊙	8570	350	20,500	[illegible]	[illegible]	0.7 T.E. RT	[illegible] T.E. DN	[illegible] T.E. DN
●	8690	246	20,100	[illegible]	[illegible]	1.0 T.E. LT	[illegible] T.E. DN	0.7 T.E. DN
△	8480	251	20,400	245,000	26.6	1.5 T.E. LT	0.7 T.E. DN	[illegible] T.E. DN
□	7680	160	[illegible]	[illegible]	26.6	1.5 T.E. LT	[illegible] T.E. DN	[illegible] T.E. DN

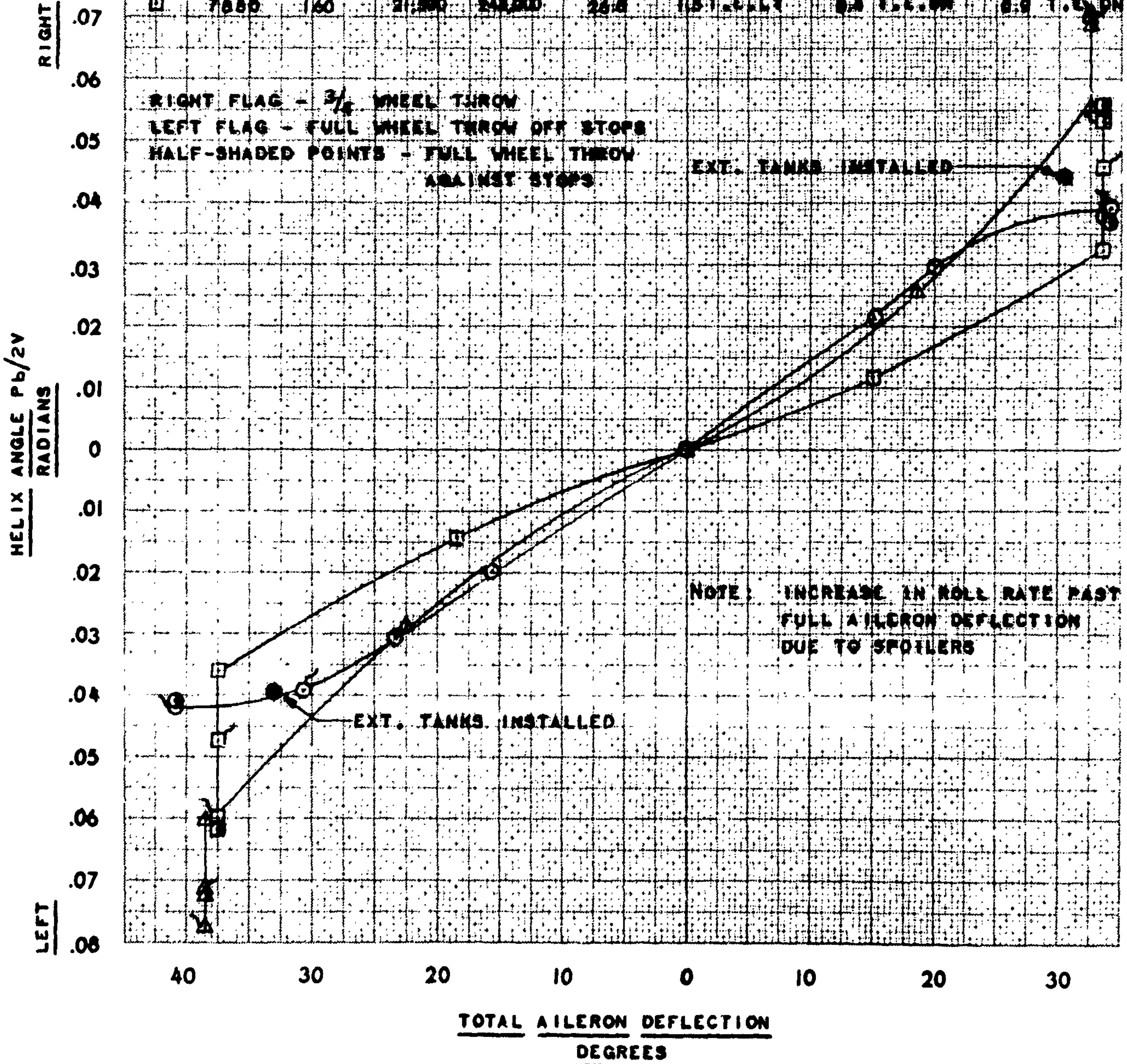
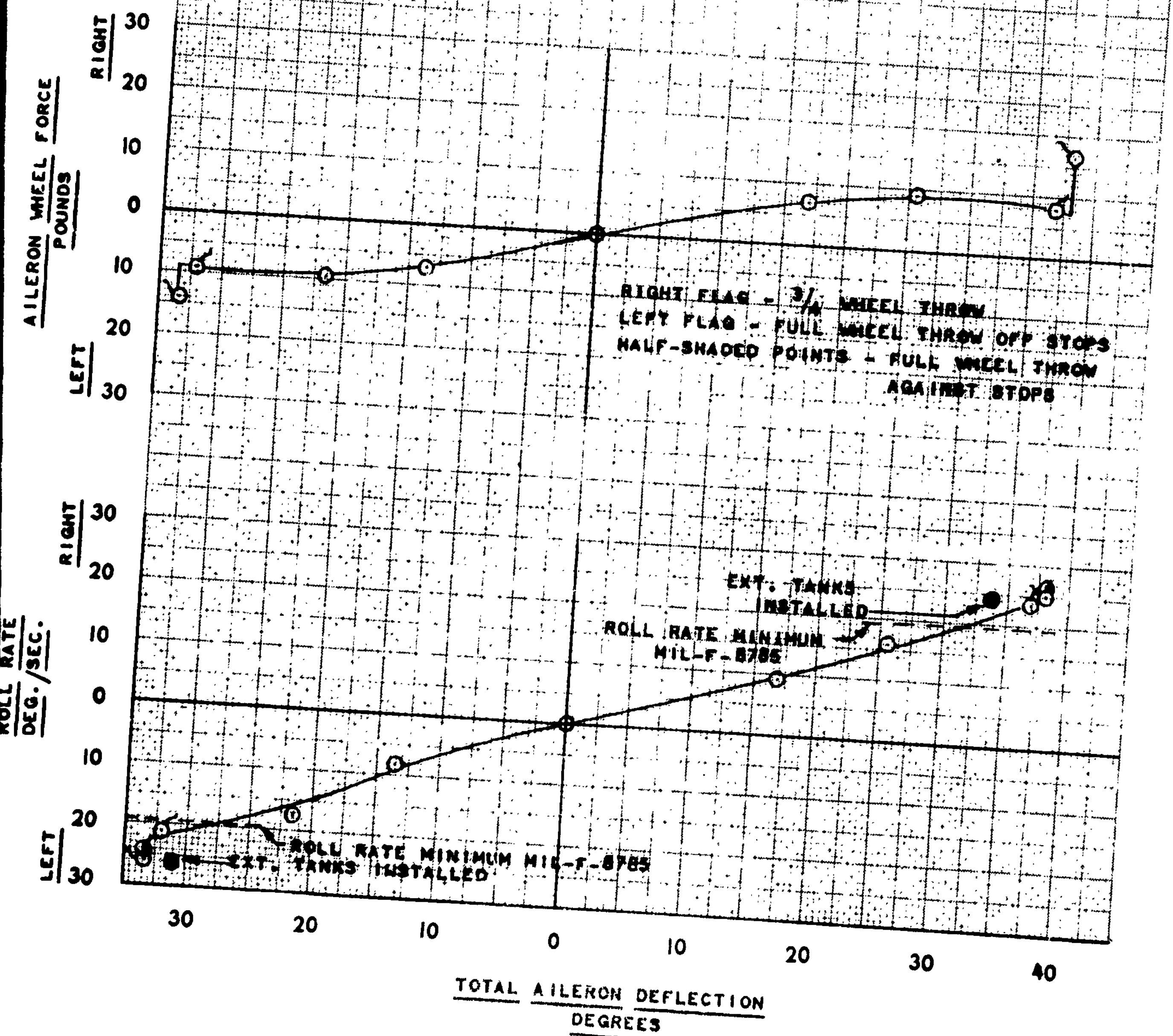


FIGURE NO. 385
AILERON CHARACTERISTICS
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION
POWER FOR LEVEL FLIGHT

SPOILERS USED; RUDDER PEDALS FIXED
NO EXTERNAL TANKS INSTALLED EXCEPT AS NOTED

TRIM CONDITIONS

SYM.	AVG. N_2 RPM	C.A.S. KNOTS	ALT. FEET	GR. WT. POUNDS	C.G. % MAC	RUD. TAB. DEGREES	L. AIL. TAB. DEGREES	R. AIL. TAB. DEGREES
○	[illegible]	204	47,500	256,000	17.5	2.3 T.E.RT	0.4 T.E.UP	0.8 T.E.DN
●	9120	203	47,350	264,000	33.2	1.8 T.E.LT	1.5 T.E.DN	0.6 T.E.UP



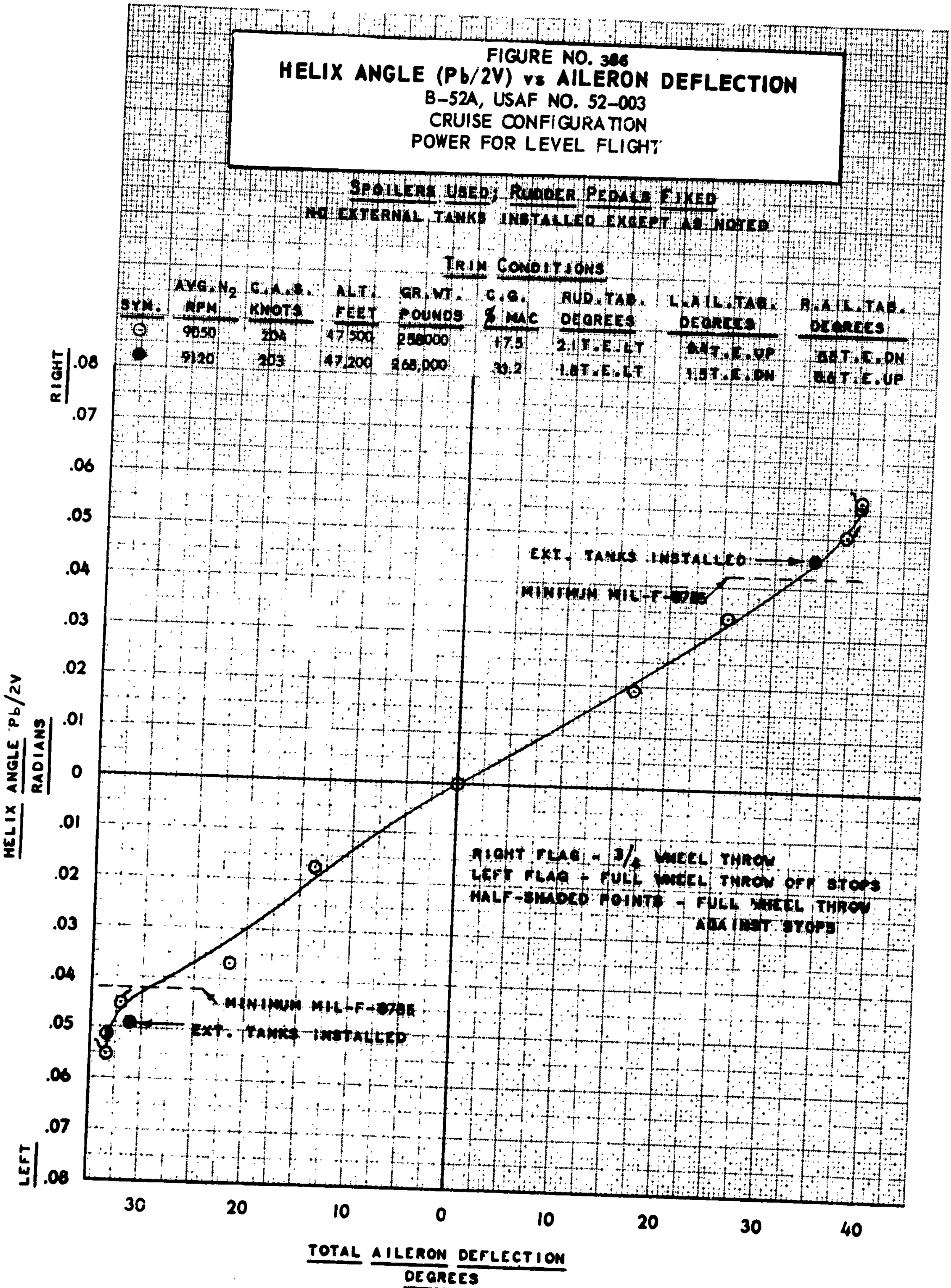


FIGURE NO. 386
HELIX ANGLE (Pb/2V) vs AILERON DEFLECTION
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION
POWER FOR LEVEL FLIGHT
SPOILERS USED; RUDDER PEDALS FIXED
NO EXTERNAL TANKS INSTALLED EXCEPT AS NOTED
TRIM CONDITIONS
SYM.
AVG. N2 RPM
C.A.S. KNOTS
ALT. FEET
GR. WT. POUNDS
C.G. % MAC
RUD. TAB. DEGREES
L. AIL. TAB. DEGREES
R. AIL. TAB. DEGREES
9050 204 47,500 258000 17.5 2.1 T.E. LT T.E. UP T.E. DN
9120 203 47,200 268,000 30.2 1.8 T.E. LT 1.5 T.E. DN T.E. UP
EXT. TANKS INSTALLED
MINIMUM MIL-F-8785
RIGHT FLAG - 3/4 WHEEL THROW
LEFT FLAG - FULL WHEEL THROW OFF STOPS
HALF-SHADED POINTS - FULL WHEEL THROW AGAINST STOPS
MINIMUM MIL-F-8785
EXT. TANKS INSTALLED
HELIX ANGLE Pb/2V
RADIANS
RIGHT
LEFT
.08
.07
.06
.05
.04
.03
.02
.01
0
.01
.02
.03
.04
.05
.06
.07
.08
30
20
10
0
10
20
30
40
TOTAL AILERON DEFLECTION
DEGREES

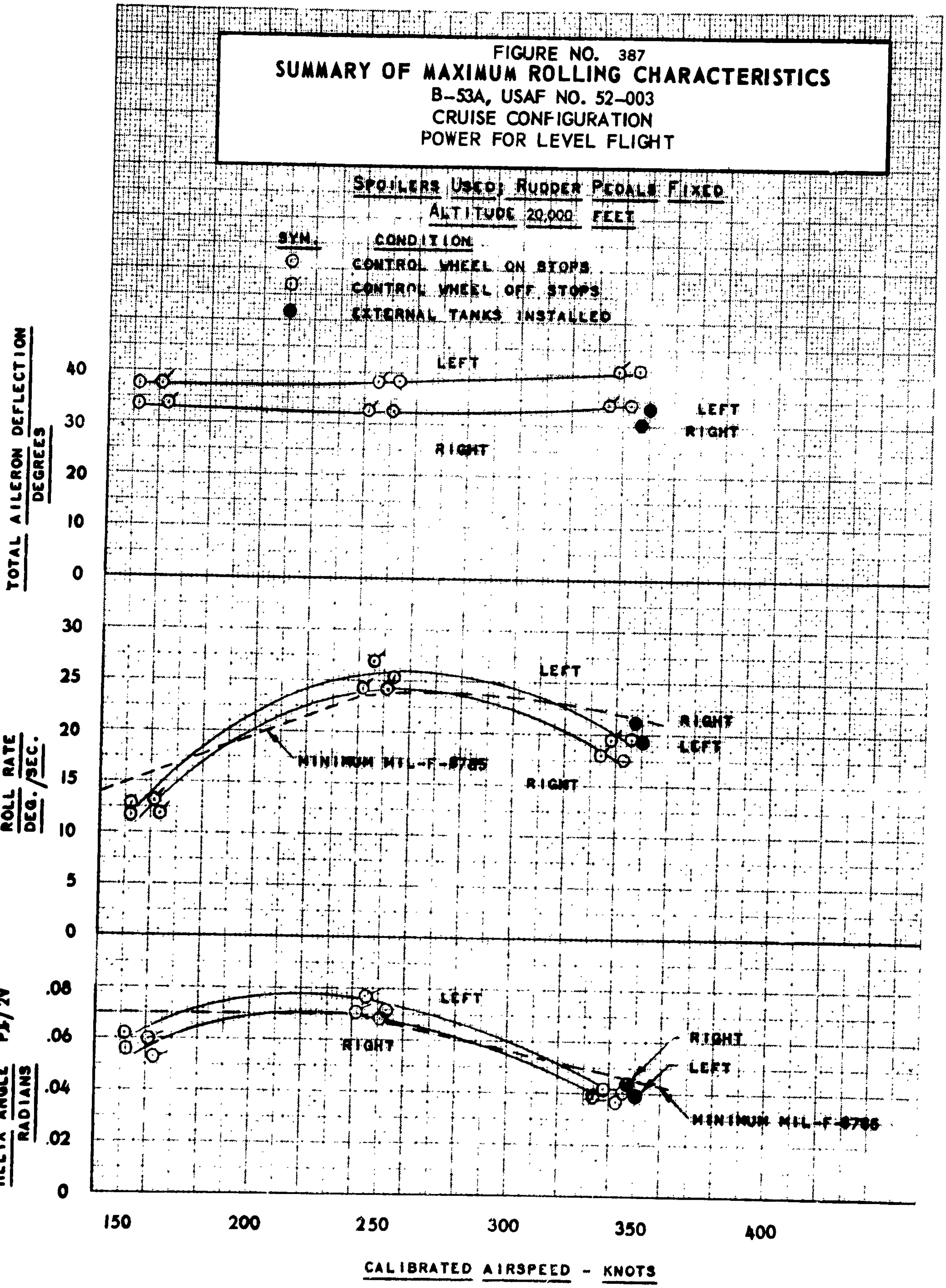


FIGURE NO. 387
SUMMARY OF MAXIMUM ROLLING CHARACTERISTICS
B-53A, USAF NO. 52-003
CRUISE CONFIGURATION
POWER FOR LEVEL FLIGHT
SPOILERS USED; RUDDER PEDALS FIXED
ALTITUDE 20,000 FEET
SYM.
CONDITION
CONTROL WHEEL ON STOPS
CONTROL WHEEL OFF STOPS
EXTERNAL TANKS INSTALLED
TOTAL AILERON DEFLECTION
DEGREES
LEFT
RIGHT
ROLL RATE
DEG./SEC.
MINIMUM MIL-F-8785
HELIX ANGLE Pb/2V
RADIANS
0
10
20
30
40
5
15
25
.02
.04
.06
.08
150
200
250
300
350
400
CALIBRATED AIRSPEED - KNOTS

FIGURE NO. 388

SUMMARY OF MAXIMUM ROLLING CHARACTERISTICS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

POWER FOR LEVEL FLIGHT

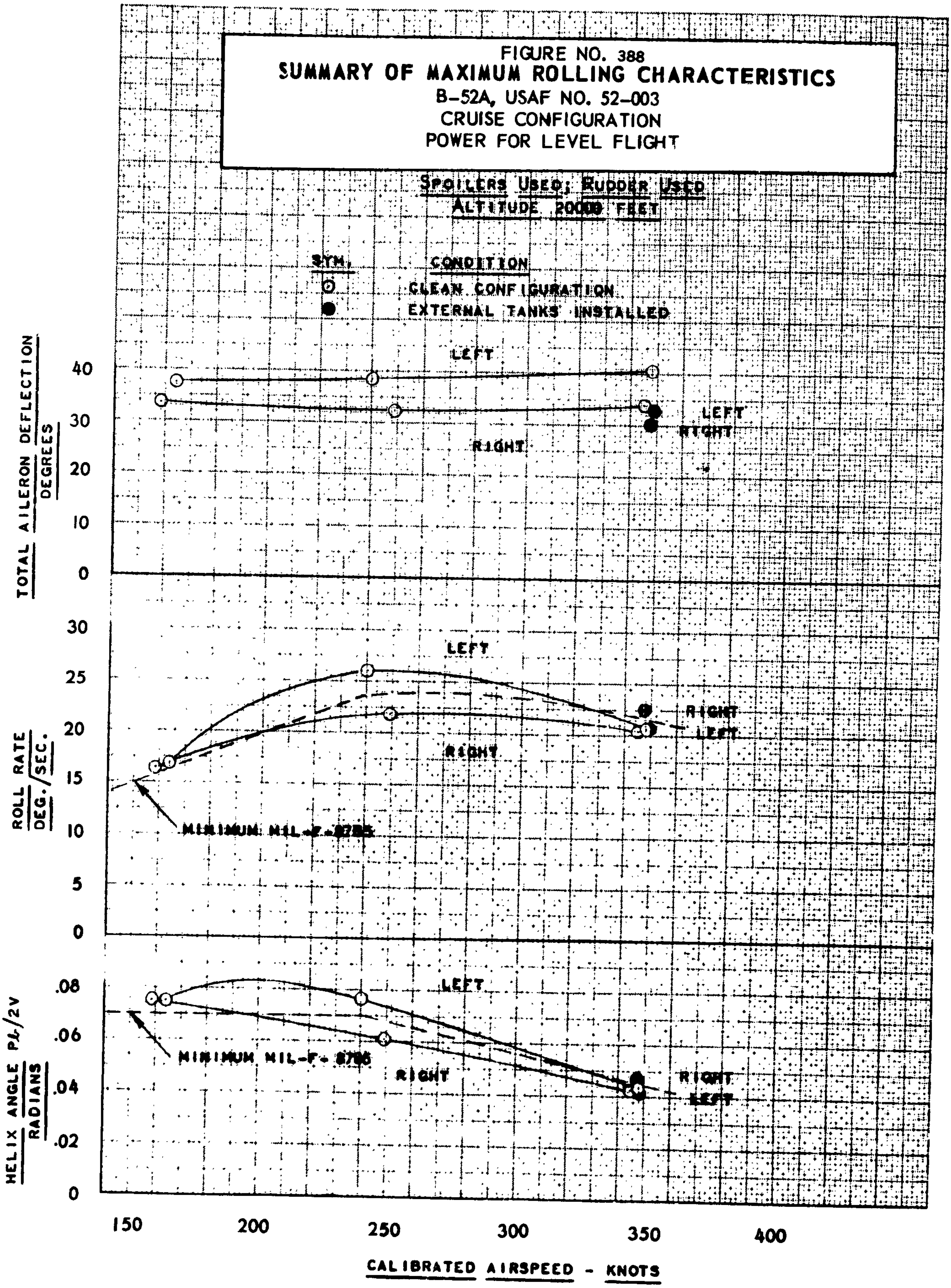


FIGURE NO. 389
SUMMARY OF MAXIMUM ROLLING CHARACTERISTICS
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION
POWER FOR LEVEL FLIGHT

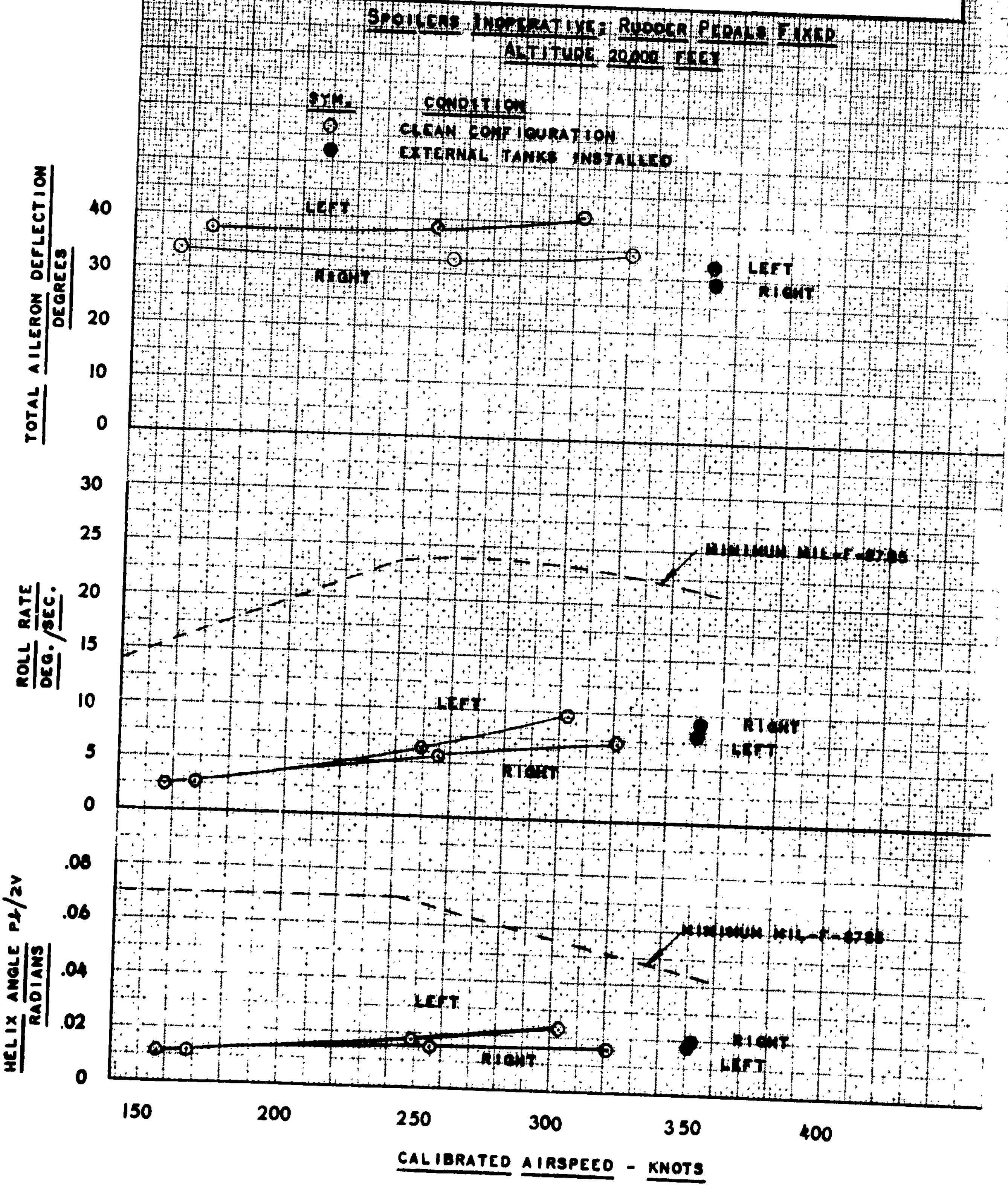
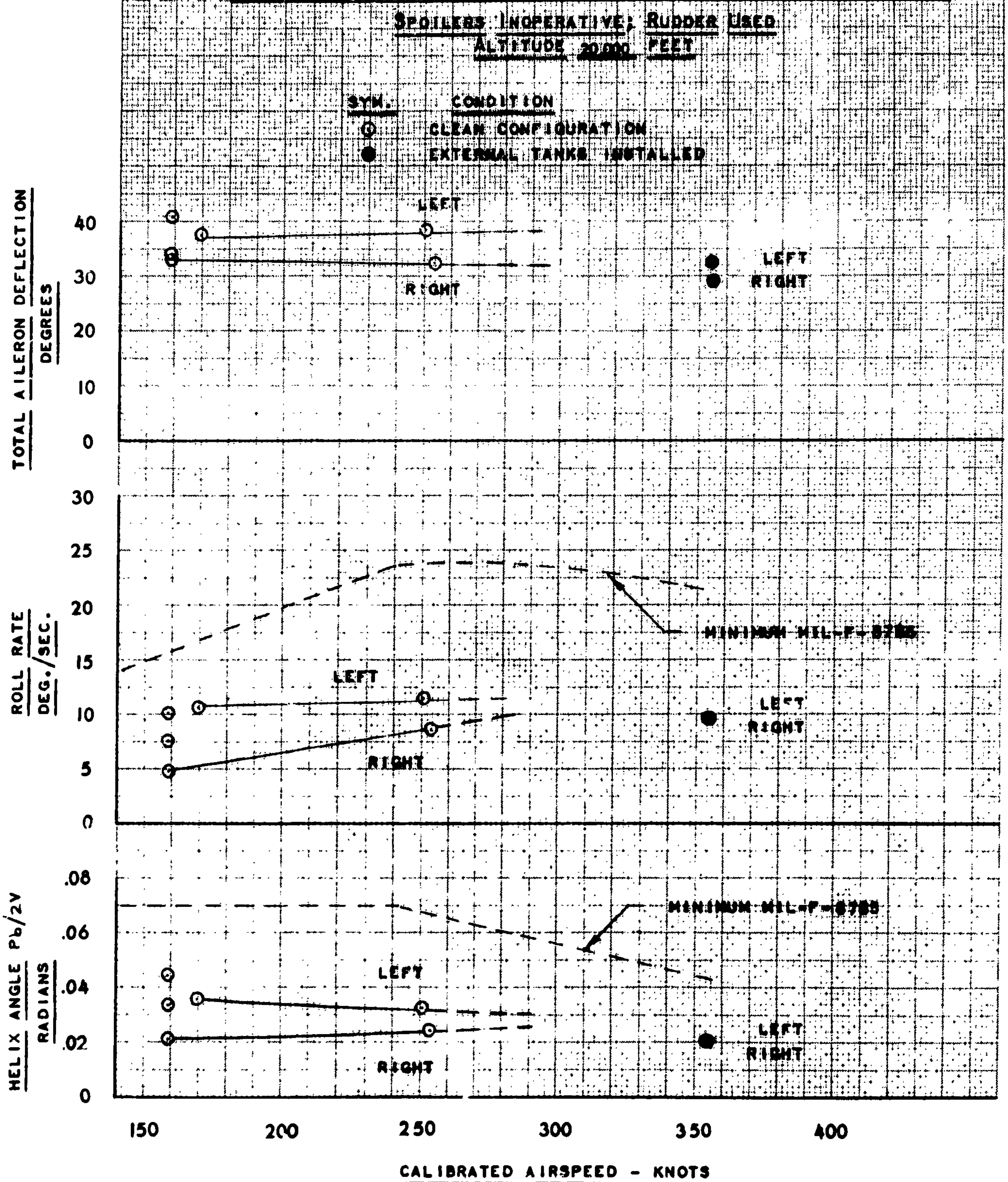


FIGURE NO. 390
SUMMARY OF MAXIMUM ROLLING CHARACTERISTICS
B-52A, USAF NO. 52-003
CRUISE CONFIGURATION
POWER FOR LEVEL FLIGHT



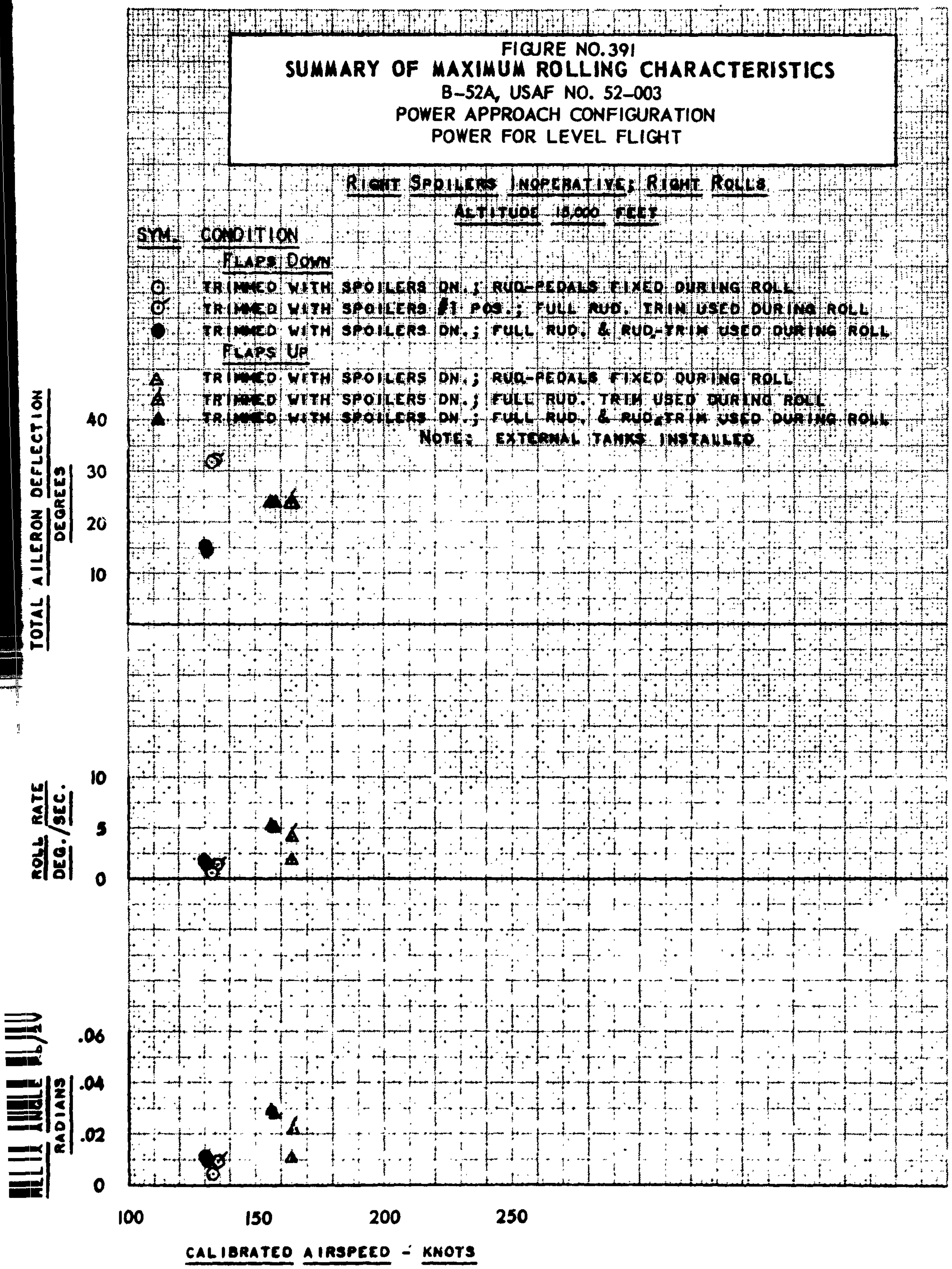


FIGURE NO. 391
SUMMARY OF MAXIMUM ROLLING CHARACTERISTICS
B-52A, USAF NO. 52-003
POWER APPROACH CONFIGURATION
POWER FOR LEVEL FLIGHT

TIME HISTORY

OF MAXIMUM

DEFLECTION AILERON ROLLS

FIGURE NO. 392

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 160.5 KNOTS; ALTITUDE 19,700 FEET
C.G. 26.8 % MAC; WEIGHT 243,000 LBS.
AVG. N2 7880 RPM; RUDDER TAB 1.5 DEG. T. E. LT.
L. AIL. TAB 0.4 DEG. T. E. UP R. AIL. TAB. 0.9 DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: RUDDER PEDALS FIXED

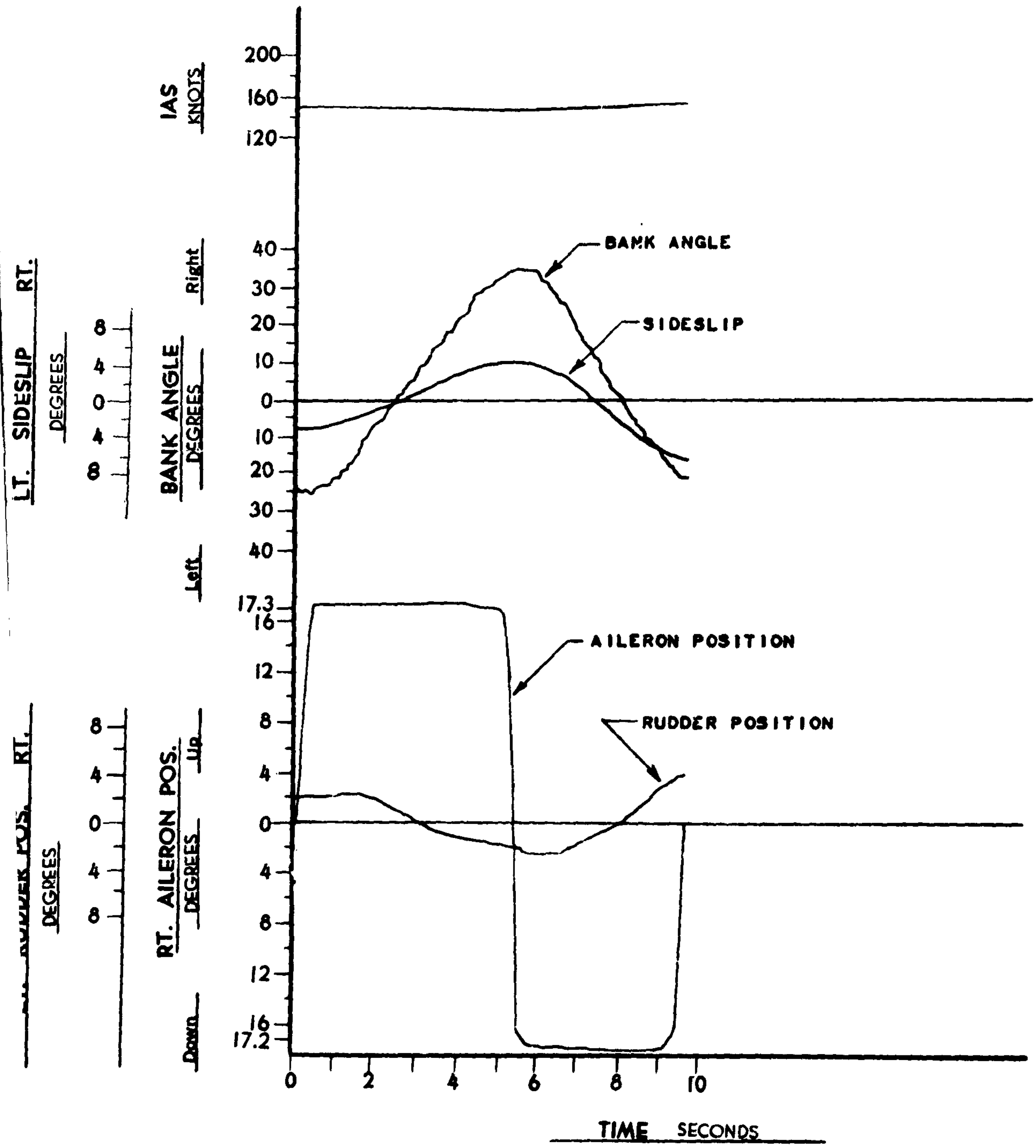


FIGURE NO. 393

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S.	160.5	KNOTS;	ALTITUDE	19,700	FEET
C.G.	26.8	% MAC;	WEIGHT	243,000	LBS.
AVG. N2	7880	RPM;	RUDDER TAB	1.5 DEG.	T. E. LT.
L. AIL. TAB	0.4 DEG.	T. E. UP	R. AIL. TAB.	0.9 DEG.	T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: RUDDER USED

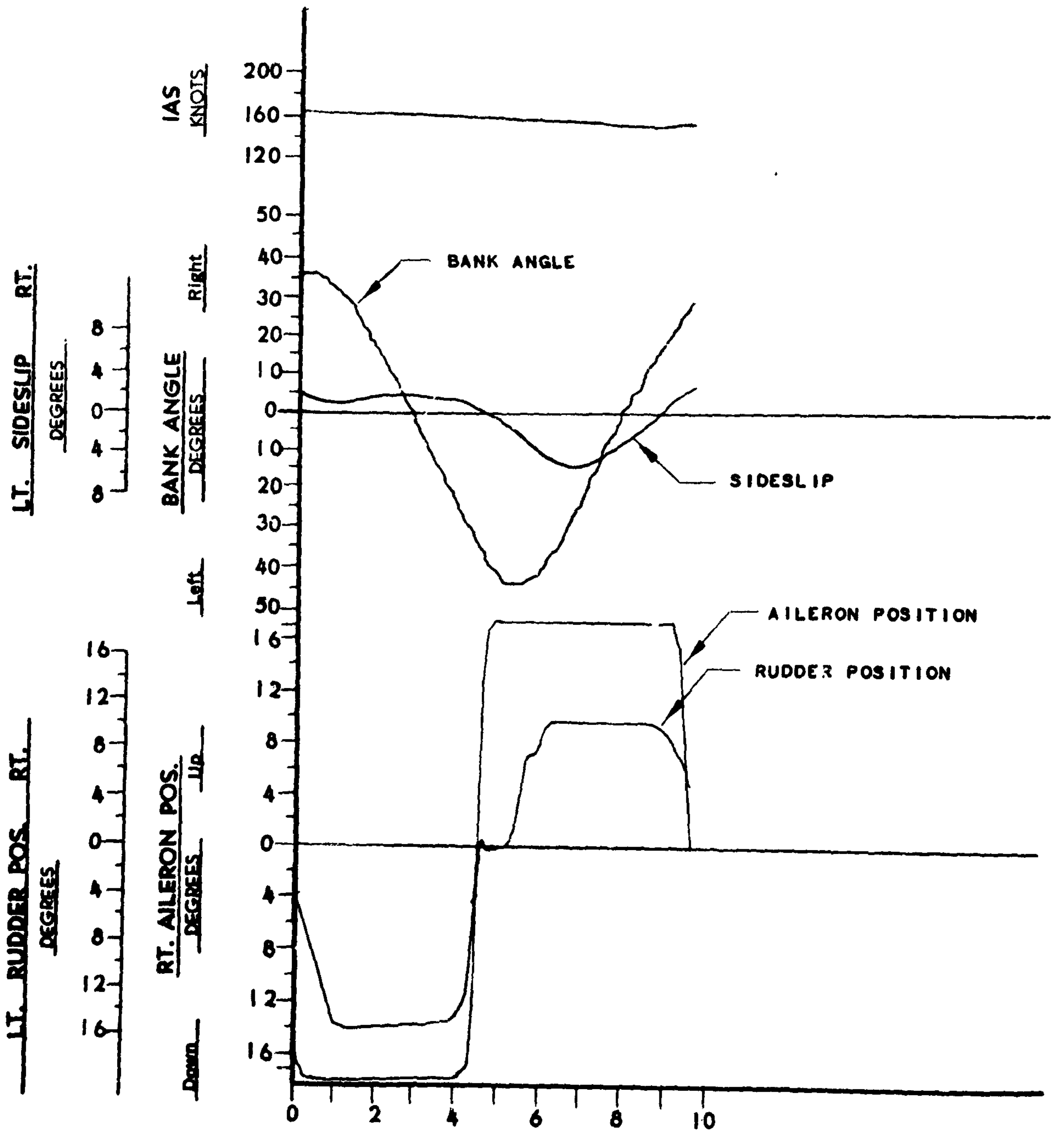


FIGURE NO.394

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

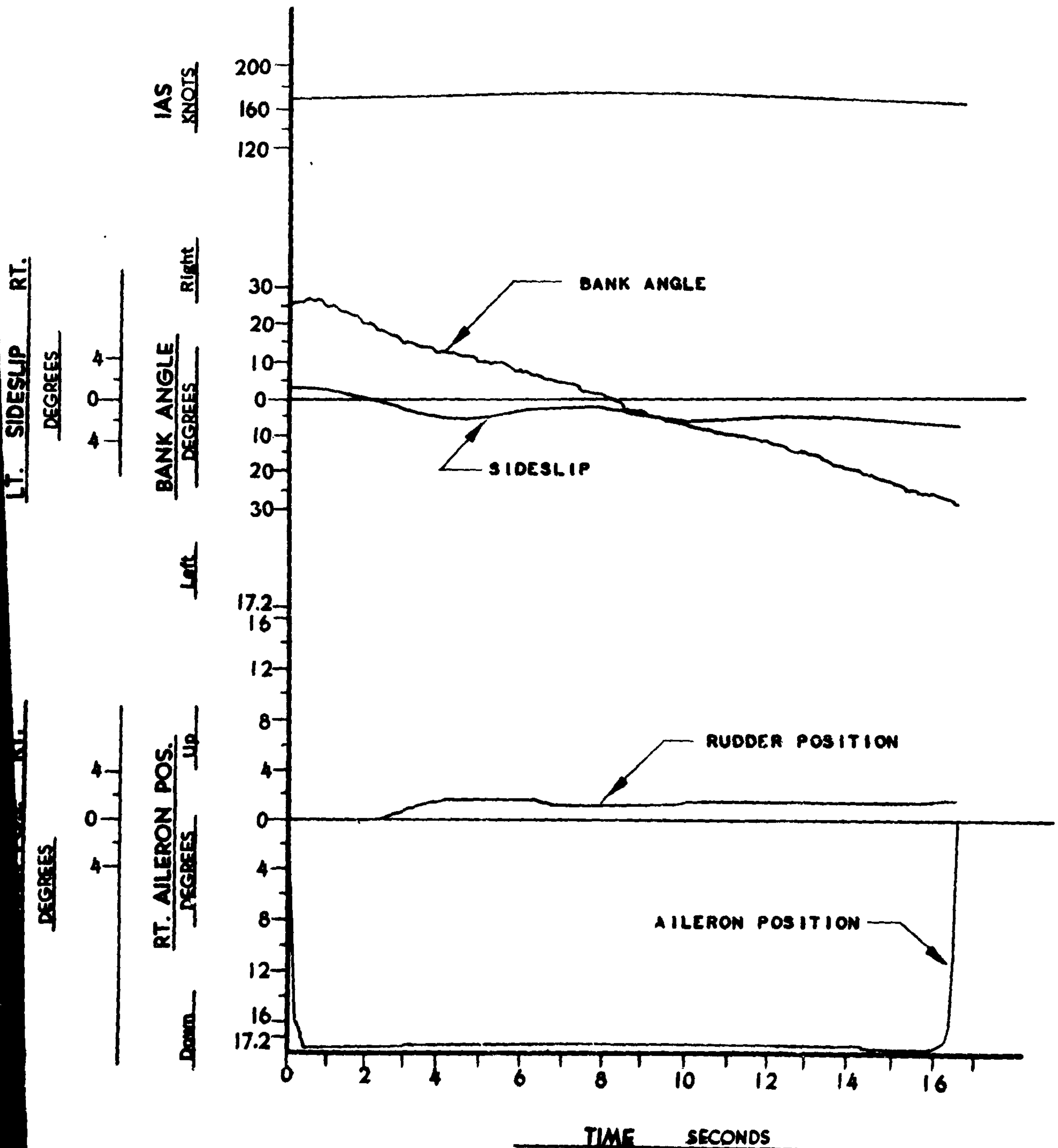
CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 160.5 KNOTS; ALTITUDE 19,700 FEET
C.G. 26.8 % MAC; WEIGHT 243,000 LBS.
AVG. N2 7880 RPM; RUDDER TAB 1.5 DEG. T. E. LT.
L. AIL. TAB 0.4 DEG. T. E. UP R. AIL. TAB. 0.9 DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: SPOILERS INOPERATIVE
RUDDER PEDALS FIXED



TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 160.5 KNOTS; ALTITUDE 19,700 FEET
C.G. 26.8 % MAC; WEIGHT 243,000 LBS.
AVG. N2 7880 RPM; RUDDER TAB 1.5 DEG. T. E. LT.
L. AIL. TAB 0.4 DEG. T. E. UP R. AIL. TAB. 0.9 DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: SPOILERS INOPERATIVE
RUDDER USED

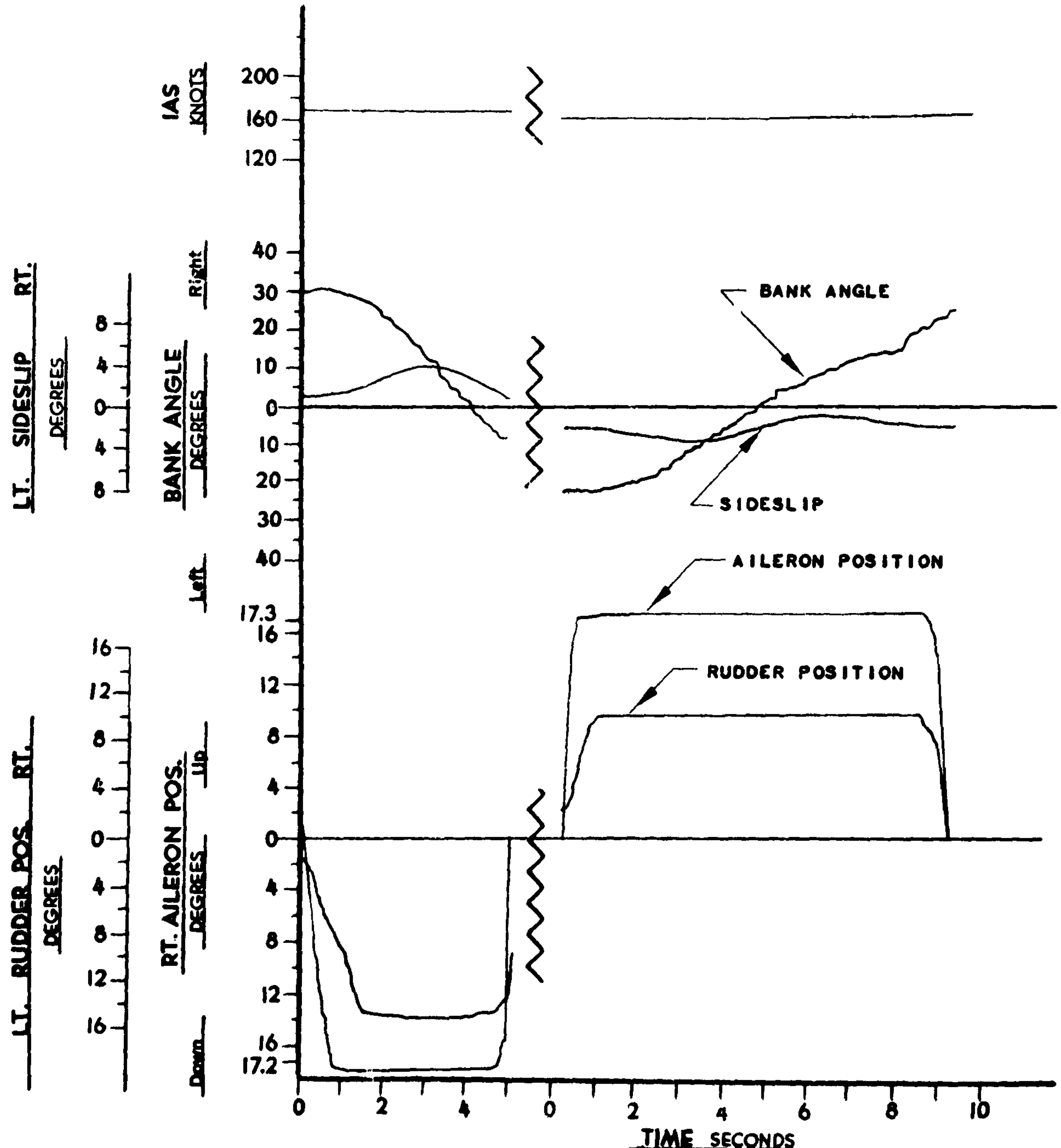


FIGURE NO. 396

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

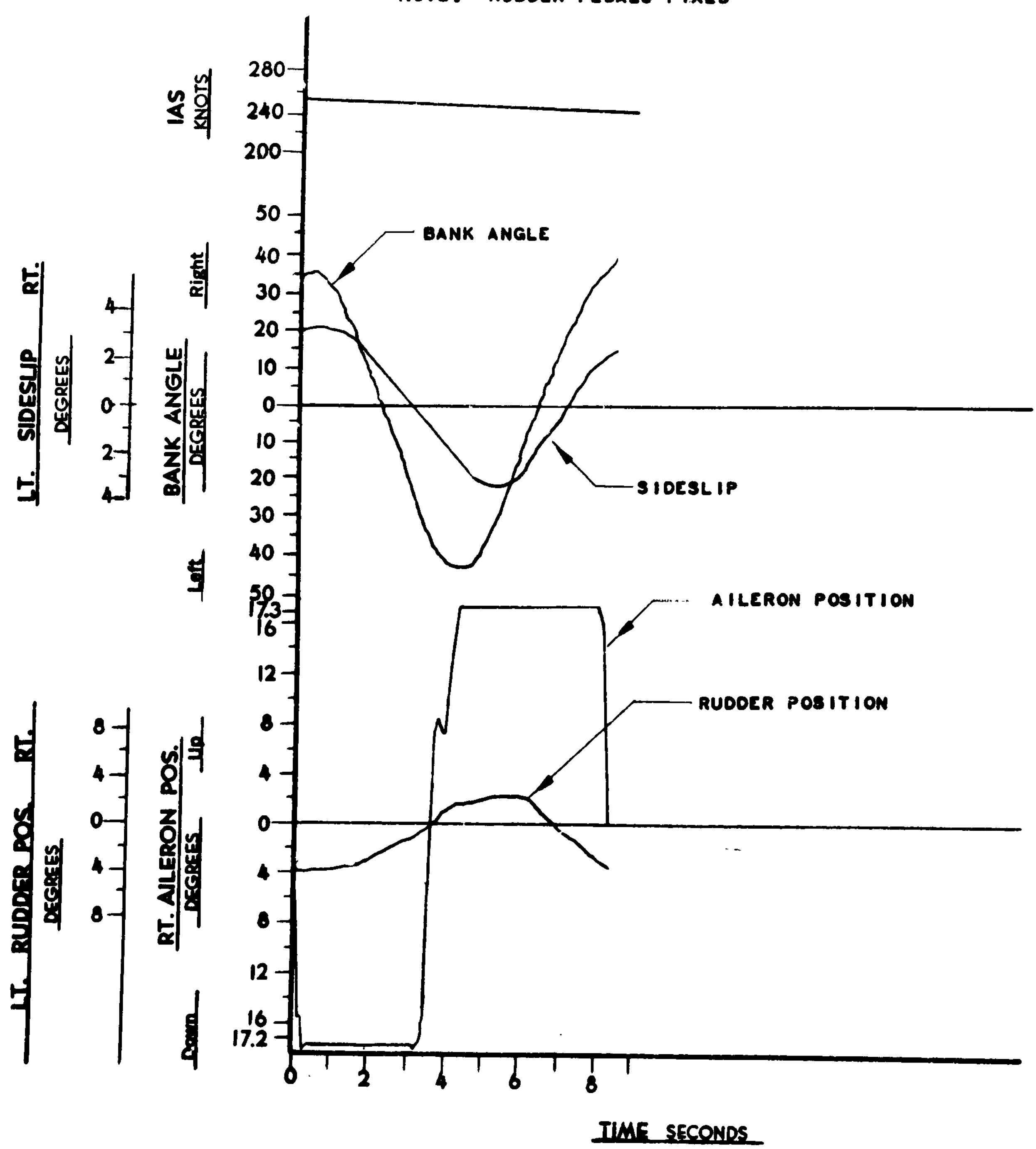
CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 250.5 KNOTS; ALTITUDE 20,500 FEET
C.G. 26.6 % MAC; WEIGHT 244.500 LBS.
AVG. N2 8,430 RPM; RUDDER TAB 1.5 DEG. T. E. LT.
L. AIL. TAB 0.7 DEG. T. E. UP R. AIL. TAB. 0.9 DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: RUDDER PEDALS FIXED



TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003
CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 250.5 KNOTS; ALTITUDE 20,500 FEET
C.G. 26.6 % MAC; WEIGHT 244,500 LBS.
AVG. N2 8430 RPM; RUDDER TAB 1.5 DEG. T. E. LT.
L. AIL. TAB 0.7 DEG. T. E. UP R. AIL. TAB. 0.9 DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: RUDDER USED

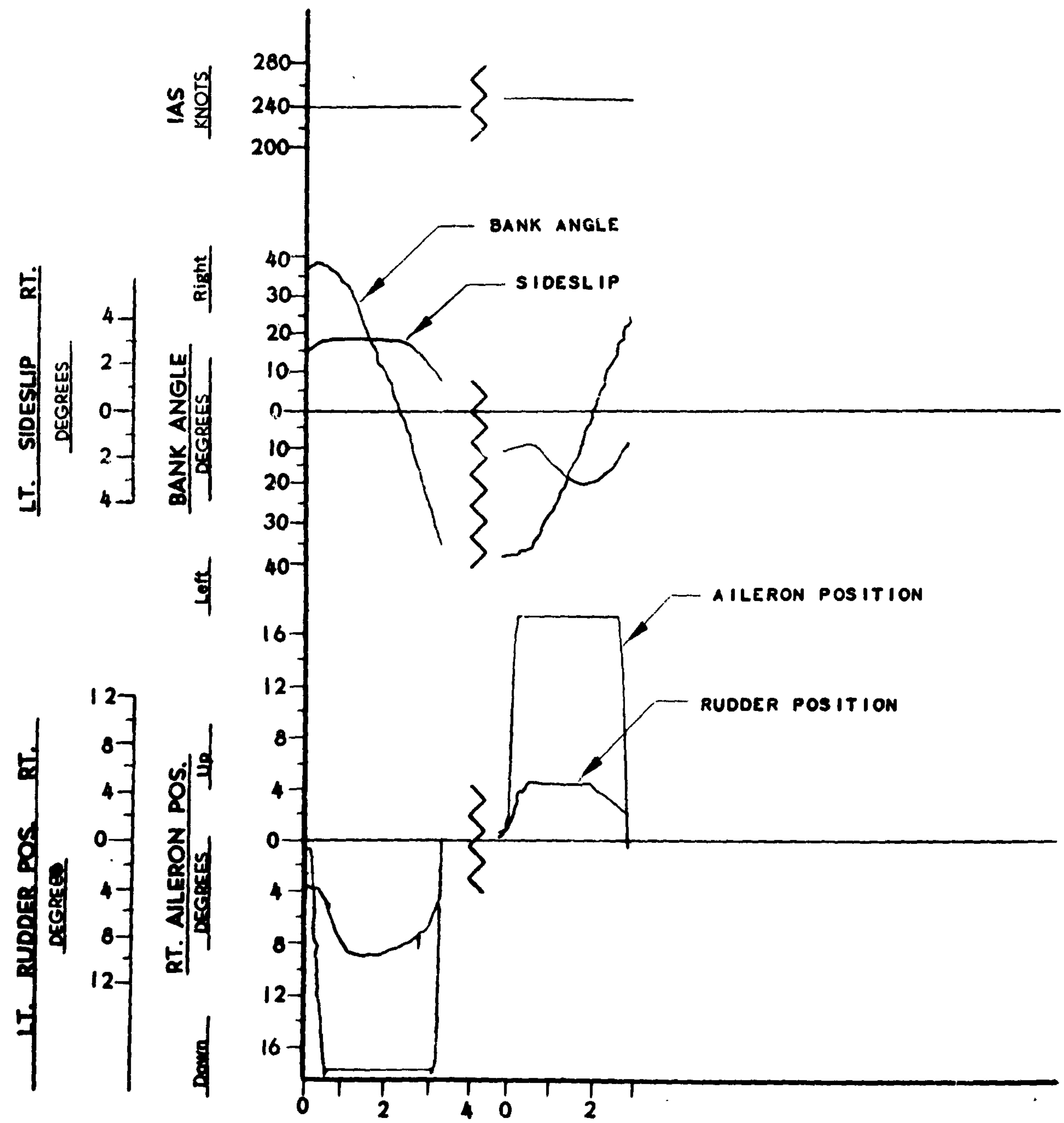


FIGURE NO. 398

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

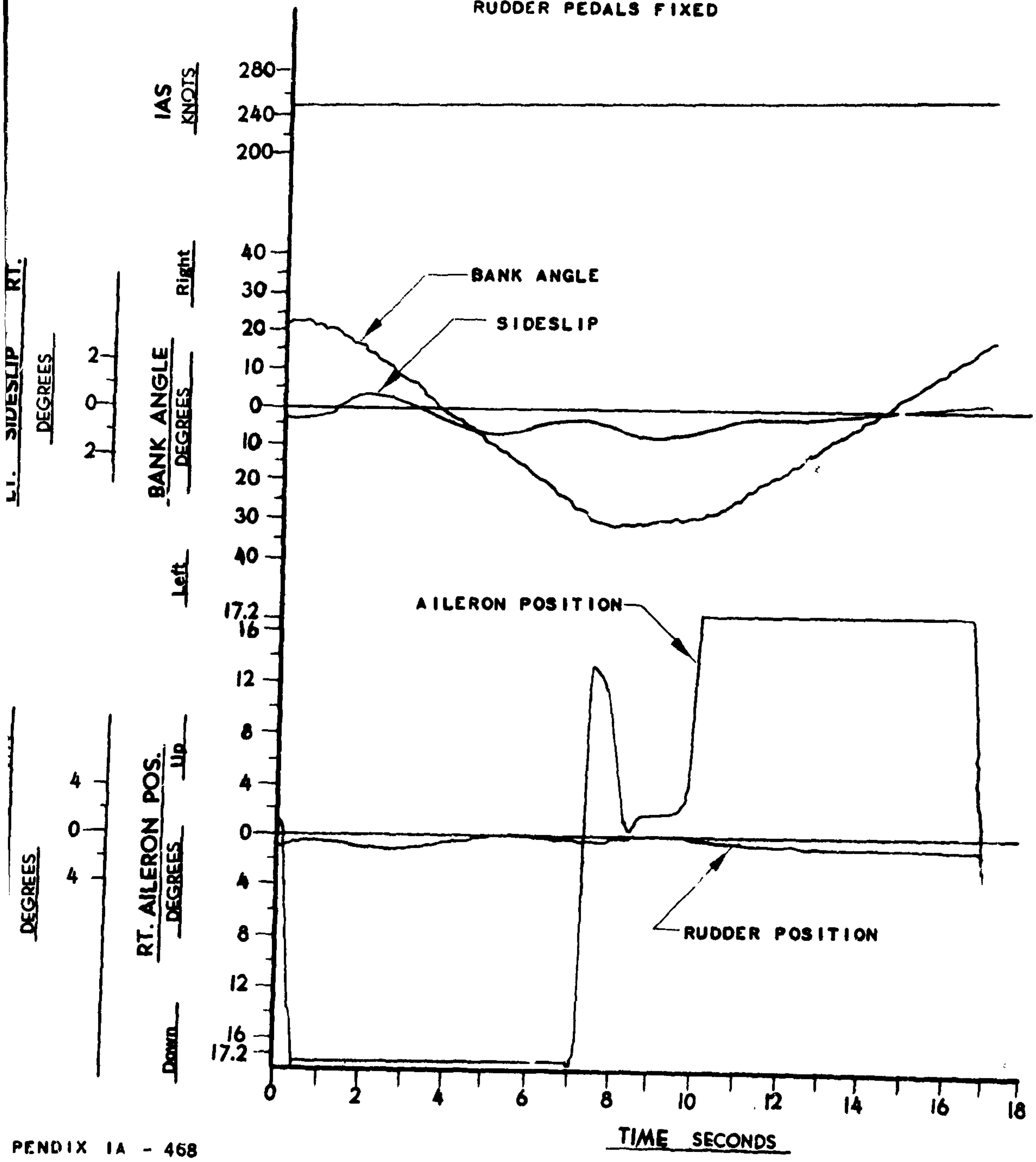
CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S.	250.5	KNOTS;	ALTITUDE	20,500	FEET
C.G.	26.6	% MAC;	WEIGHT	244,500	LBS.
AVG. N2	8430	RPM;	RUDDER TAB	1.5 DEG. T. E. LT.	
L. AIL. TAB	0.7 DEG. T. E. UP		R. AIL. TAB.	0.9 DEG. T. E. DN.	

NO EXTERNAL TANKS INSTALLED

NOTE: SPOILERS INOPERATIVE
RUDDER PEDALS FIXED



TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 250.5	KNOTS:	ALTITUDE	20,500 FEET
C.G. 26.6	% MAC;	WEIGHT	244,500 LBS.
AVG. N_2 8430	RPM;	RUDDER TAB	1.5 DEG. T. E. LT.
L. AIL. TAB 0.7 DEG. T. E. UP		R. AIL. TAB.	0.9 DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: SPOILERS INOPERATIVE
RUDDER USED

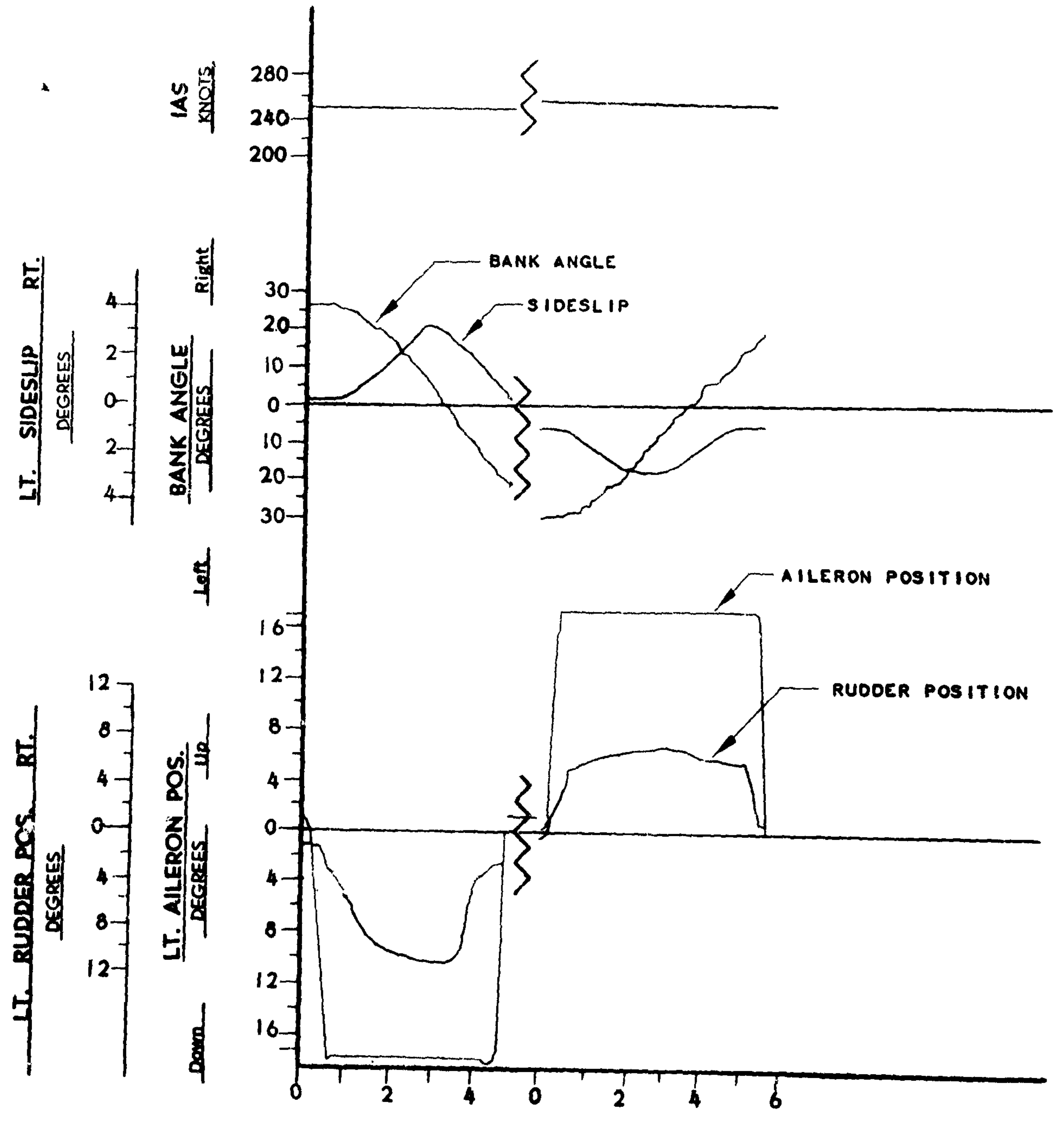


FIGURE NO. 400

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

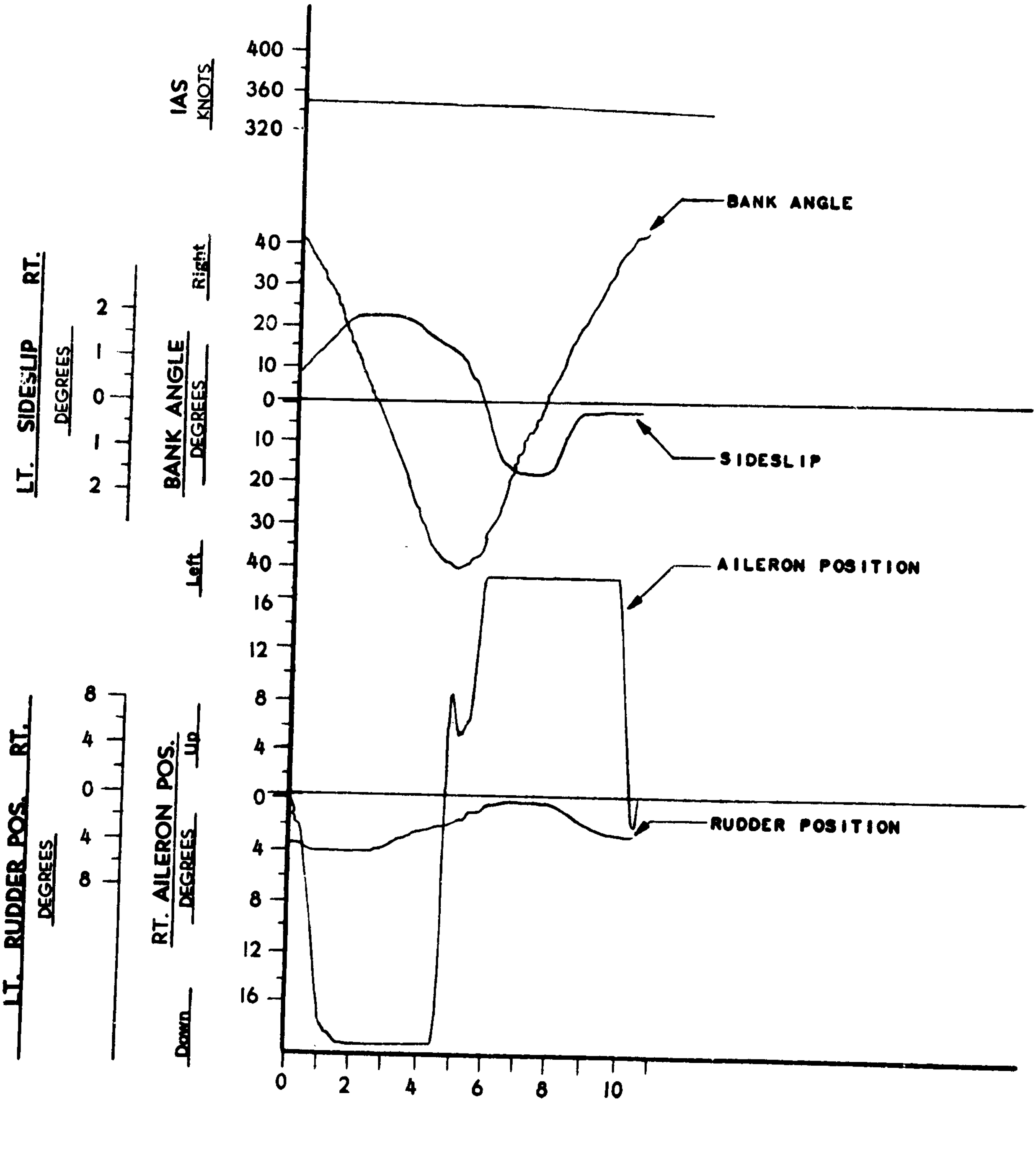
CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 349 KNOTS; ALTITUDE 19,900 FEET
C.G. 24.4 % MAC; WEIGHT 254,000 LBS.
AVG. N2 8570 RPM; RUDDER TAB 0 DEG.
L. AIL. TAB 0.8 DEG. T. E. DN. R. AIL. TAB. 0.7 DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: RUDDER PEDALS FIXED



TIME SECONDS

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 349 KNOTS; ALTITUDE 19,900 FEET
C.G. 24.4 % MAC; WEIGHT 254,000 LBS.
AVG. N2 8570 RPM; RUDDER TAB 0 DEG.
L. AIL. TAB 0.8 DEG. T. E. DN. R. AIL. TAB. 0.7 DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: FULL RUDDER USED

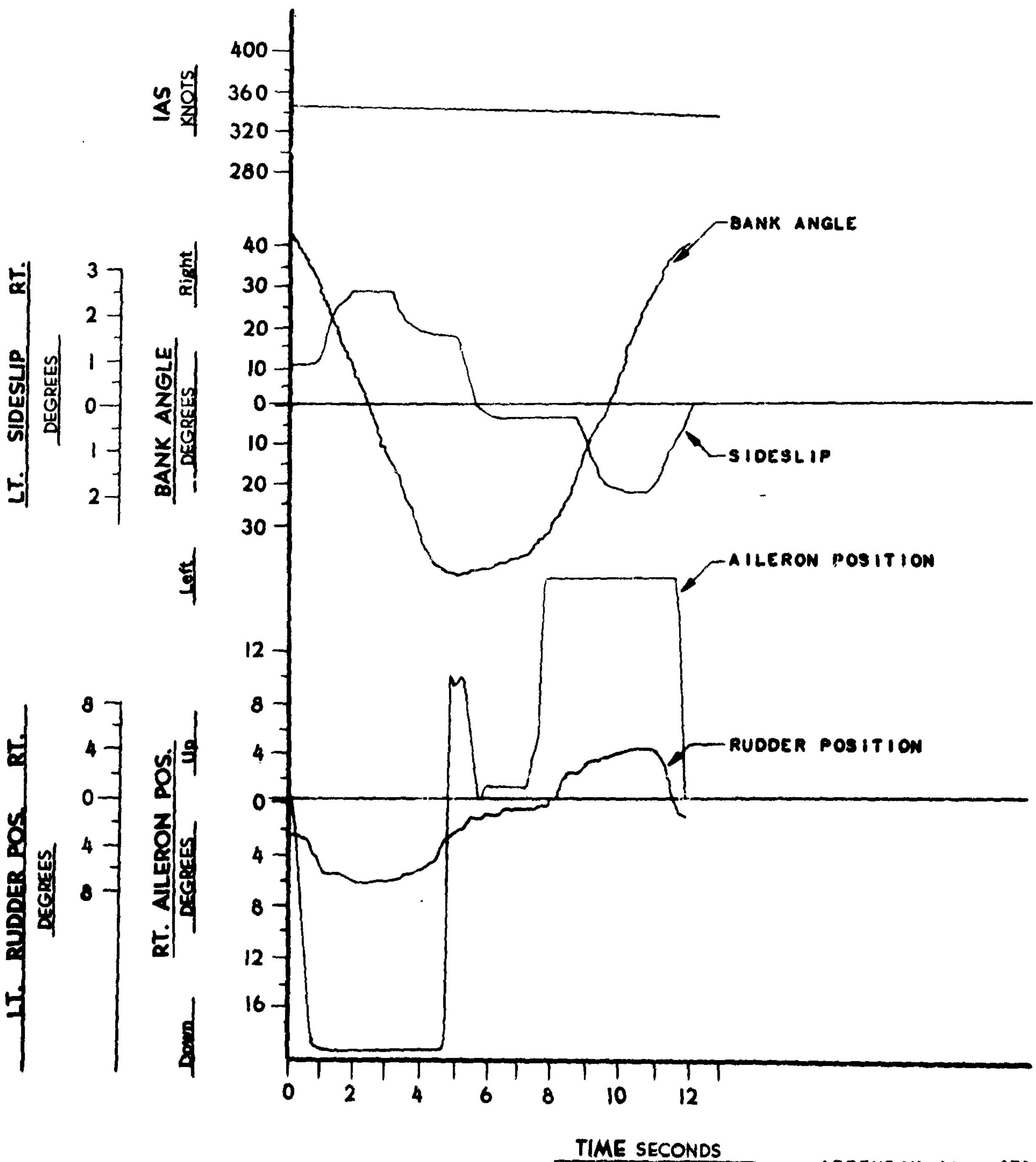


FIGURE NO. 402

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 349 KNOTS; ALTITUDE 19,900 FEET
C.G. 24.4 % MAC; WEIGHT 254,000 LBS.
AVG. N2 8570 RPM; RUDDER TAB 0 DEG.
L. AIL. TAB 0.8 DEG. T. E. DN. R. AIL. TAB. 0.7 DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: SPOILERS INOPERATIVE
RUDDER PEDALS FIXED

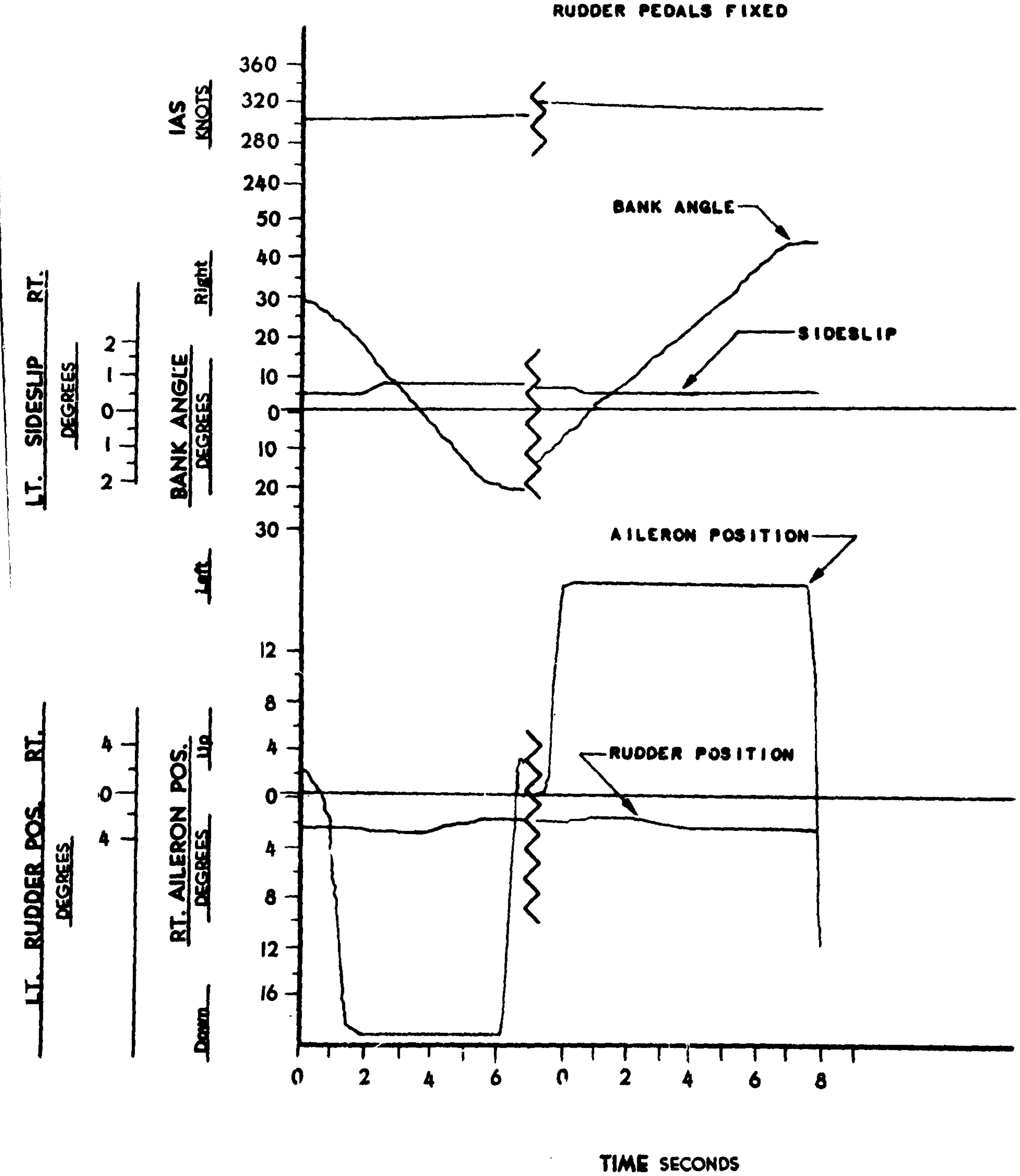


FIGURE NO. 403

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 349 KNOTS; ALTITUDE 19,900 FEET
C.G. 24.4 % MAC; WEIGHT 254,000 LBS.
AVG. N2 8570 RPM; RUDDER TAB 0 DEG.
L. AIL. TAB 0.8 DEG. T. E. DN. R. AIL. TAB. 0.7 DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: SPOILERS INOPERATIVE
FULL RUDDER USED

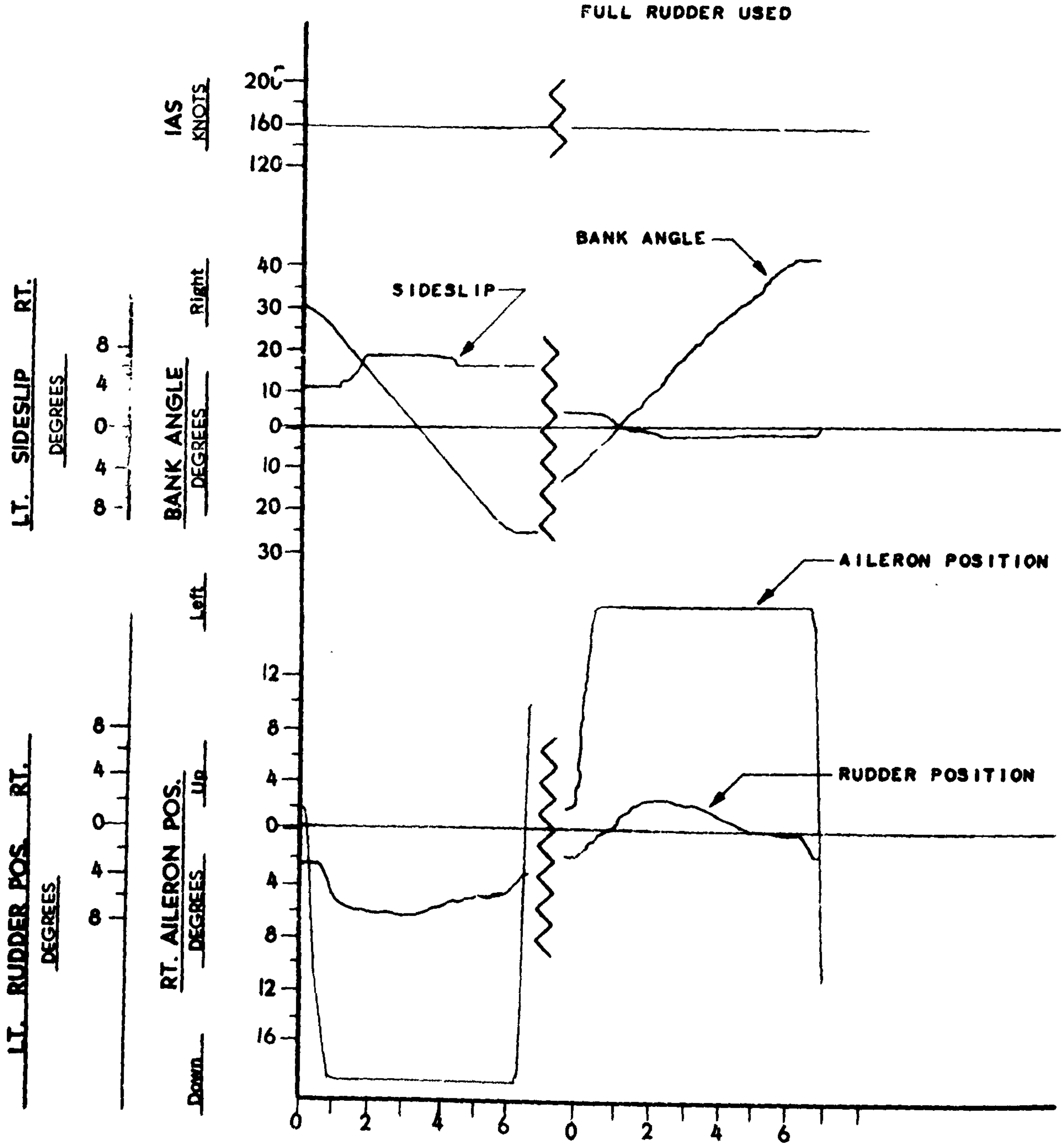


FIGURE NO. 404

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 346 KNOTS; ALTITUDE 20,100 FEET
C.G. 23.2 % MAC; WEIGHT 276,500 LBS.
AVG. N_2 8690 RPM; RUDDER TAB 1.8 DEG. T. E. LT.
L. AIL. TAB 0.2 DEG. T. E. DN. R. AIL. TAB. 0.7 DEG. T. E. DN.

EXTERNAL TANKS INSTALLED

NOTE: RUDDER PEDALS FIXED

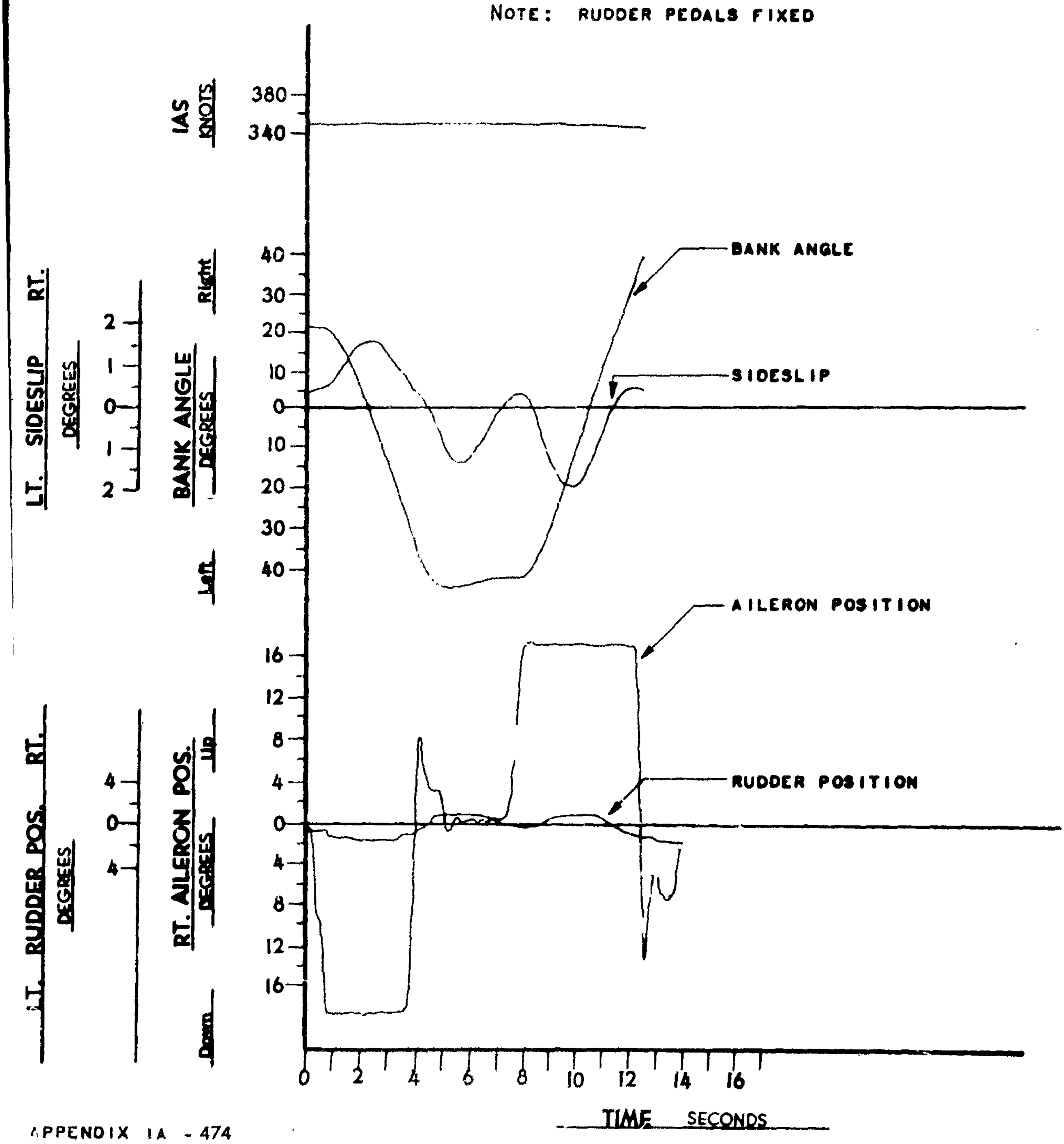


FIGURE NO. 405

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S.	346	KNOTS ;	ALTITUDE	20,100	FEET
C.G.	23.2	% MAC;	WEIGHT	276,500	LBS.
AVG. N2	8690	RPM;	RUDDER TAB	1.8 DEG. T. E. LT.	
L. AIL. TAB	0.2 DEG. T. E. DN.		R. AIL. TAB.	0.7 DEG. T. E. DN.	

EXTERNAL TANKS INSTALLED

NOTE: FULL RUDDER USED

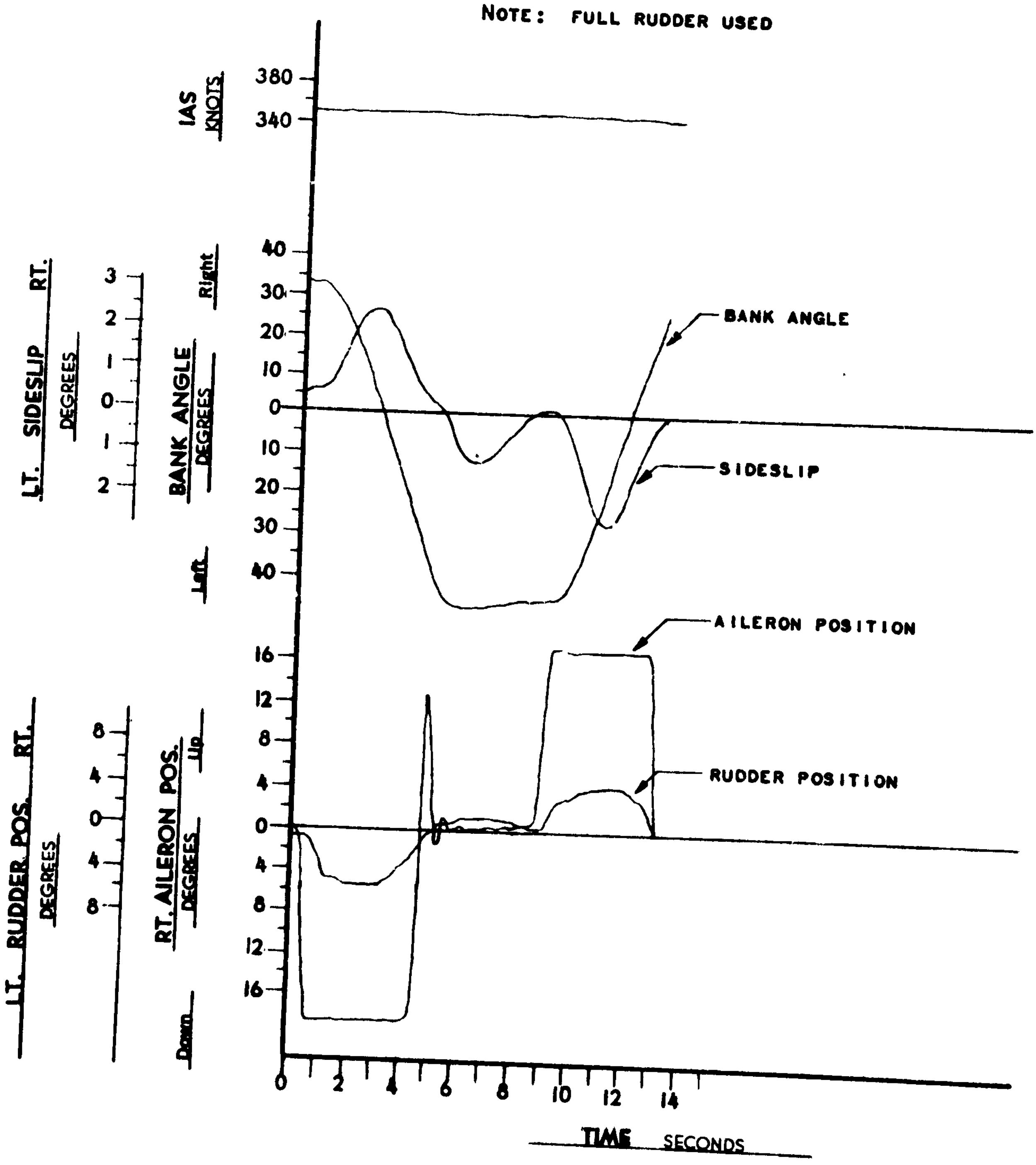


FIGURE NO. 406

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S.	346	KNOTS;	ALTITUDE	20100	FEET
C.G.	23.2	% MAC;	WEIGHT	276500	LBS.
AVG. N2	8690	RPM;	RUDDER TAB	1.8	DEG. T. E. LT.
L. AIL. TAB	0.2 DEG. T. E. DN.		R. AIL. TAB.	0.7	DEG. T. E. DN.

EXTERNAL TANKS INSTALLED

NOTE: SPOILERS INOPERATIVE
RUDDER PEDALS FIXED

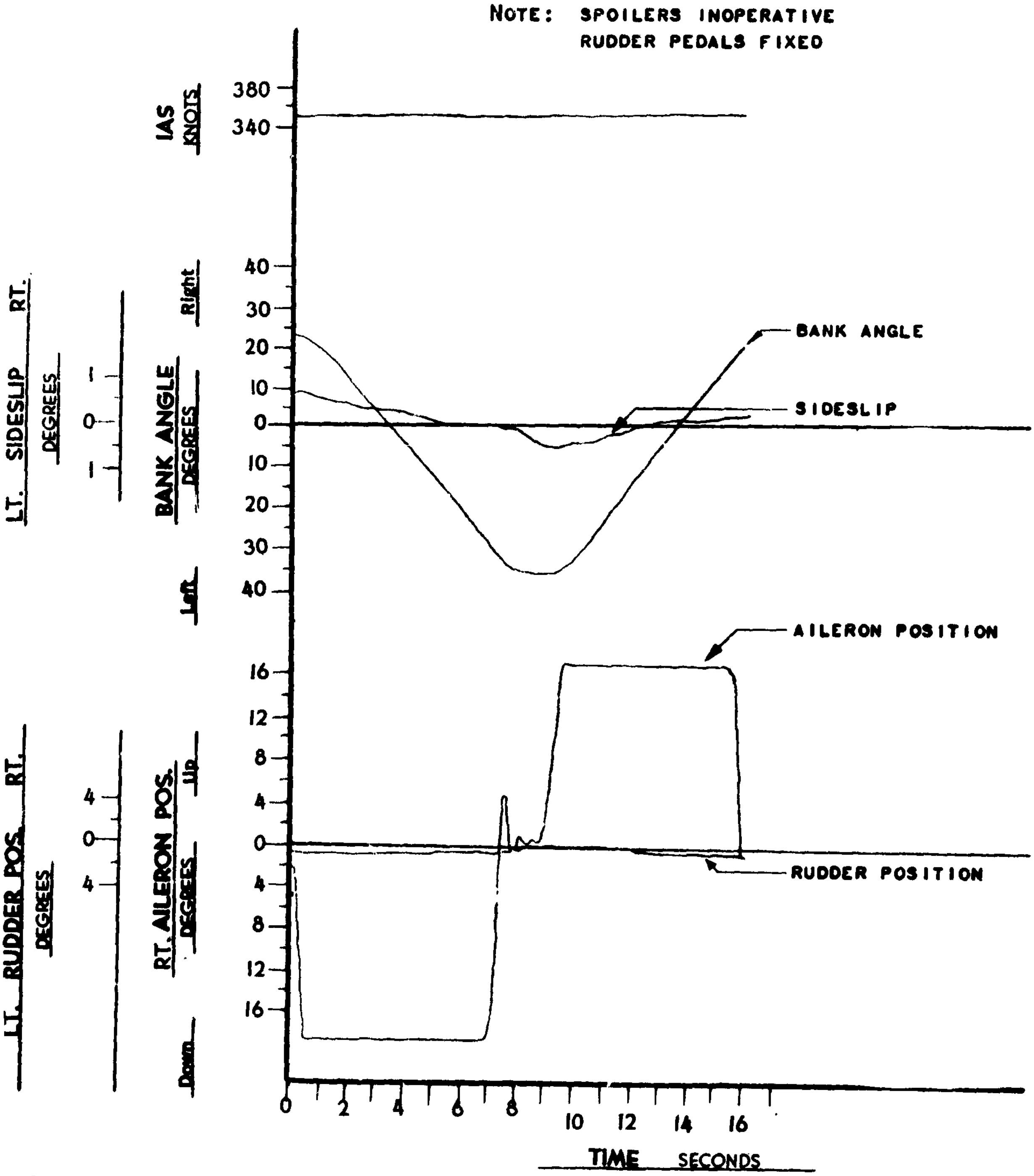


FIGURE NO. 407

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S.	346	KNOTS;	ALTITUDE	20100	FEET
C.G.	23.2	% MAC;	WEIGHT	76500	LBS.
AVG. N_2	8690	RPM;	RUDDER TAB	1.8 DEG. T. E. LT.	
L. AIL. TAB	0.2 DEG. T. E. DN.		R. AIL. TAB.	.7 DEG. T. E. DN.	

EXTERNAL TANKS INSTALLED

NOTE: SPOILERS INOPERATIVE
FULL RUDDER USED

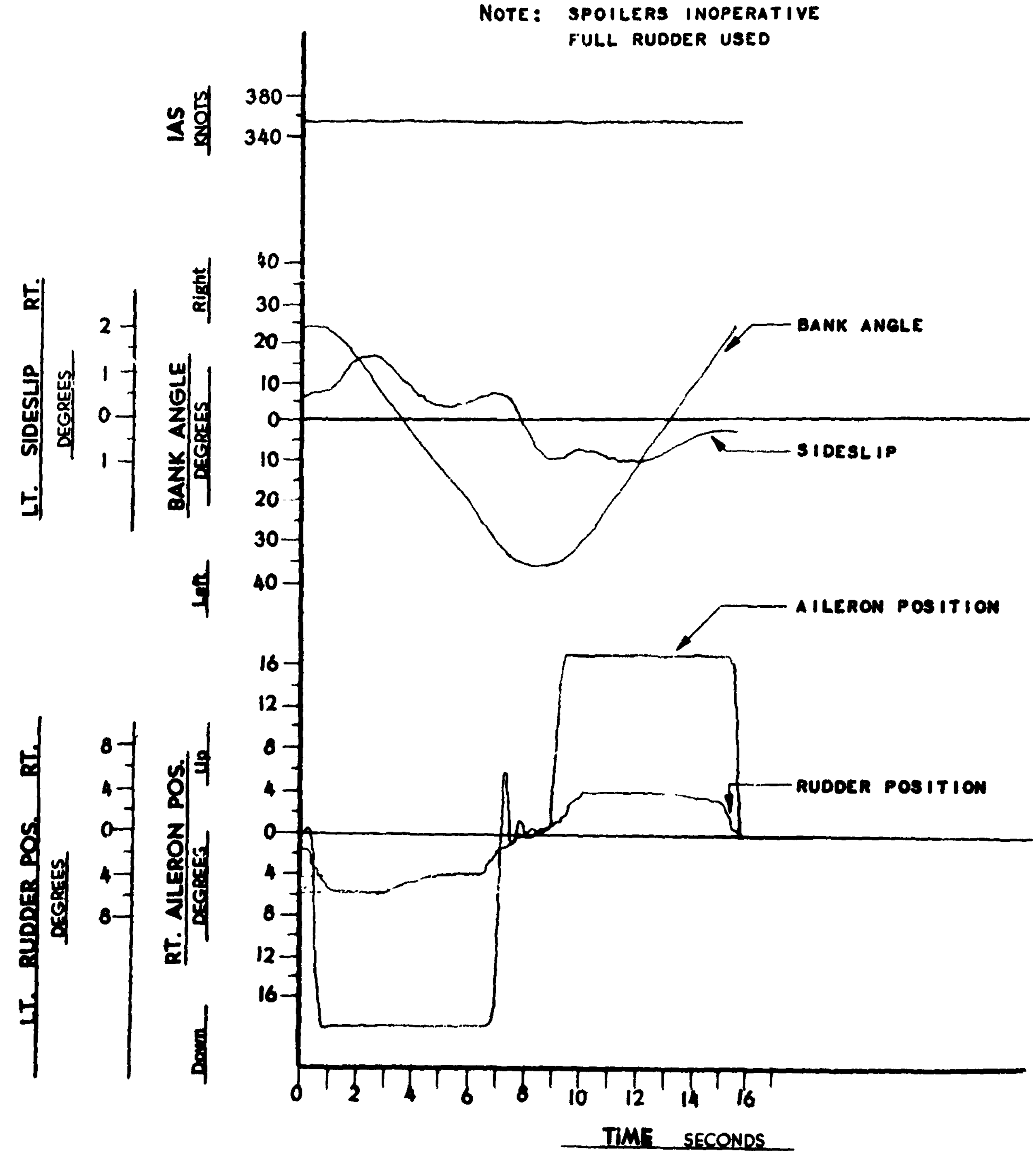


FIGURE NO. 408

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S. 203 KNOTS ; ALTITUDE 47,500 FEET
C.G. 17.5 % MAC; WEIGHT 258,000 LBS.
AVG. N2 9050 RPM; RUDDER TAB 2.1 DEG. T. E. LT.
L. AIL. TAB 0.4 DEG. T. E. UP R. AIL. TAB. 0.8 DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: RUDDER PEDALS FIXED

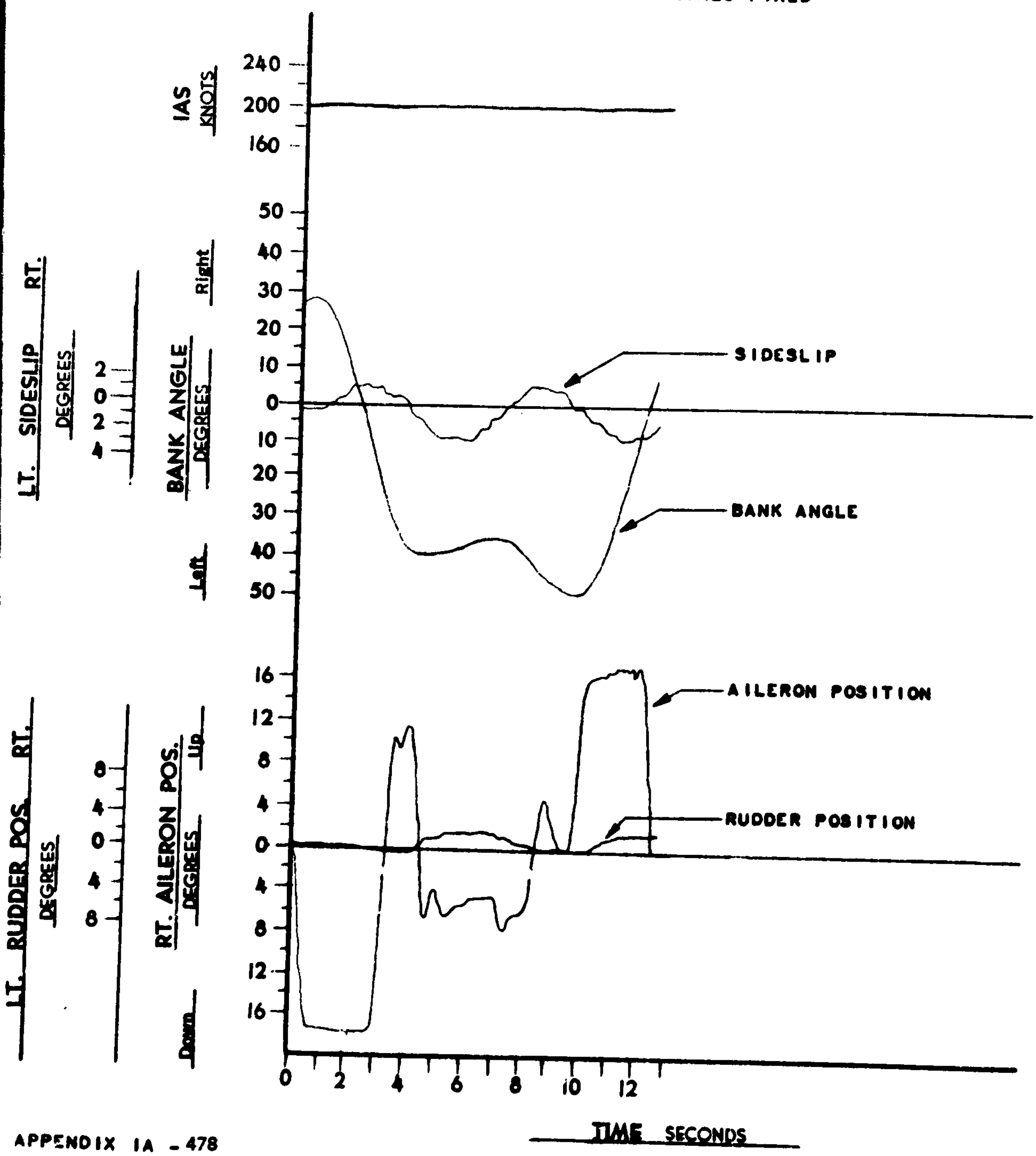


FIGURE NO. 409

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S.	203 KNOTS;	ALTITUDE	47,500 FEET
C.G.	17.5 % MAC;	WEIGHT	258,000 LBS.
AVG. N_2	9050 RPM;	RUDDER TAB	2.1 DEG. T. E. LT.
L. AIL. TAB	0.4 DEG. T. E. UP;	R. AIL. TAB.	0.8 DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: FULL RUDDER USED

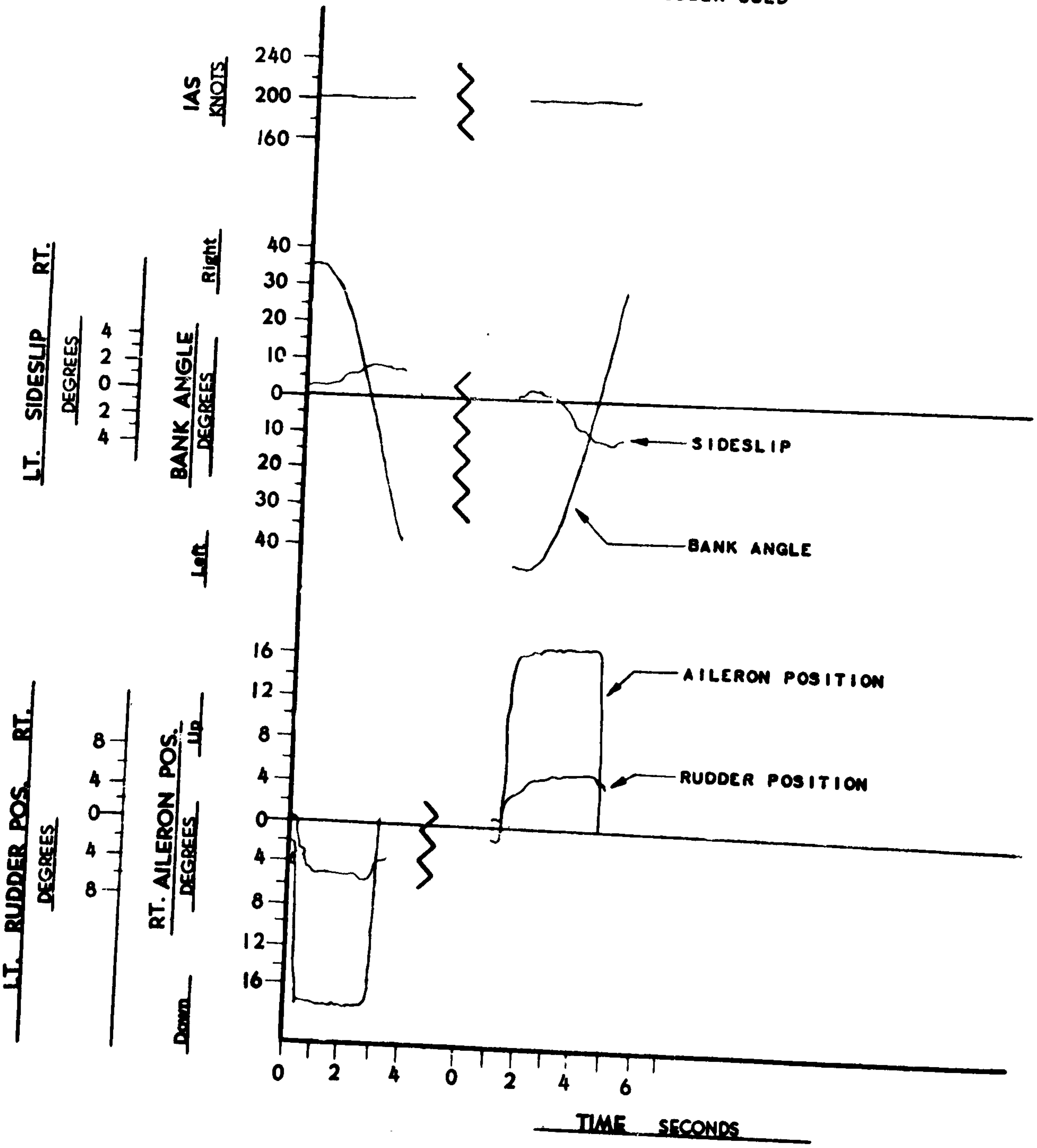


FIGURE NO. 410

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATION

TRIM CONDITIONS

C.A.S.	203	KNOTS;	ALTITUDE	47,500	FEET
C.G.	17.5	% MAC;	WEIGHT	258,000	LBS.
AVG. N2	9050	RPM;	RUDDER TAB	2.1	DEG. T. E. LT.
L. AIL. TAB	0.4	DEG. T. E. UP	R. AIL. TAB.	0.8	DEG. T. E. DN.

NO EXTERNAL TANKS INSTALLED

NOTE: SPOILERS INOPERATIVE
RUDDER PEDALS FIXED

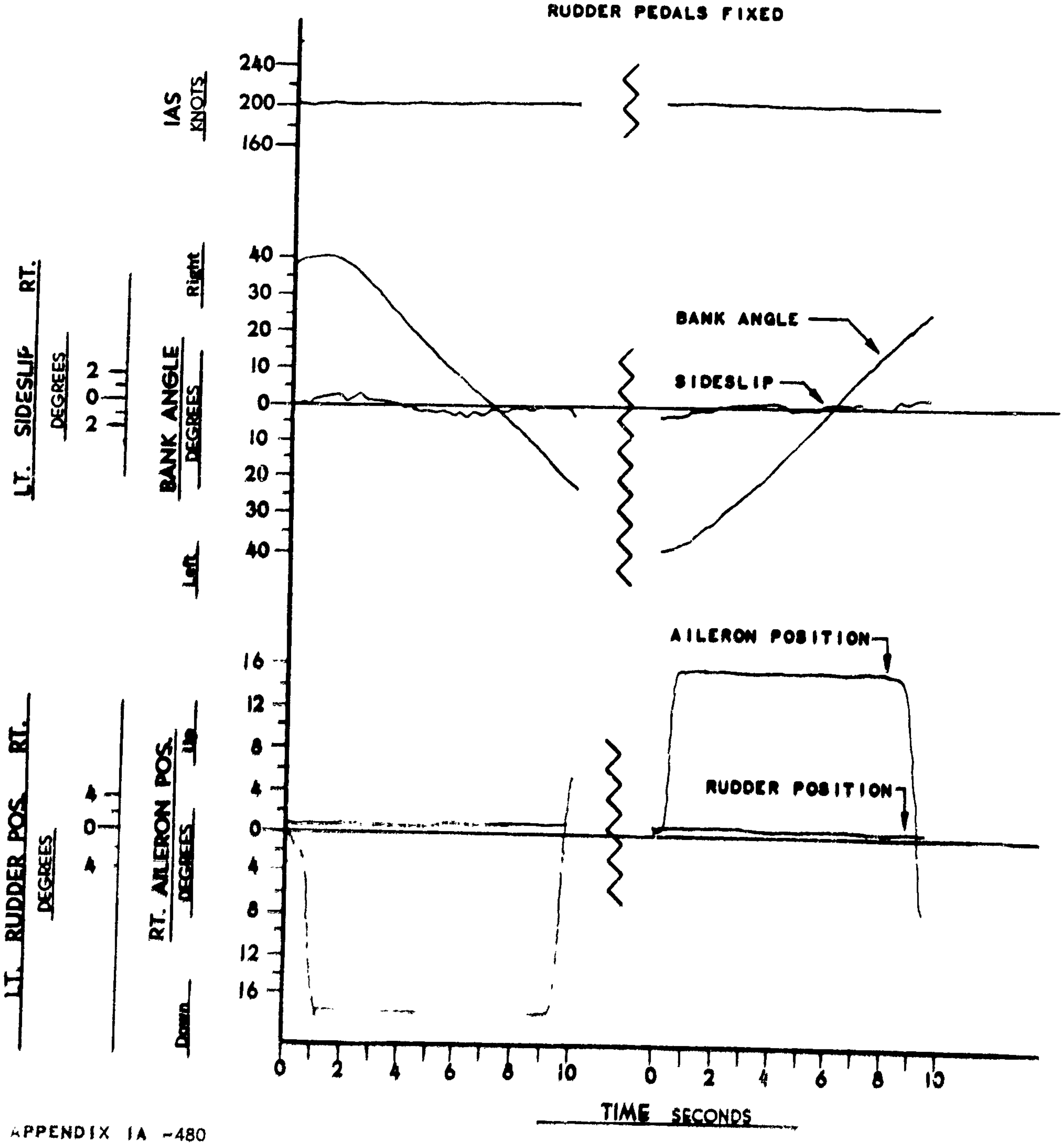


FIGURE NO. 411

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

CRUISE CONFIGURATICN

TRIM CONDITIONS

C.A.S.	203	KNOTS ;	ALTITUDE	47,500	FEET
C.G.	17.5	% MAC;	WEIGHT	258,000	LBS.
AVG. N2	9050	RPM;	RUDDER TAB 2.1 DEG. T. E. LT.		
L. AIL. TAB 0.4 DEG. T. E. UP			R. AIL. TAB. 0.8 DEG. T. E. DN.		

NO EXTERNAL TANKS INSTALLED

NOTE: SPOILERS INOPERATIVE
RUDDER USED

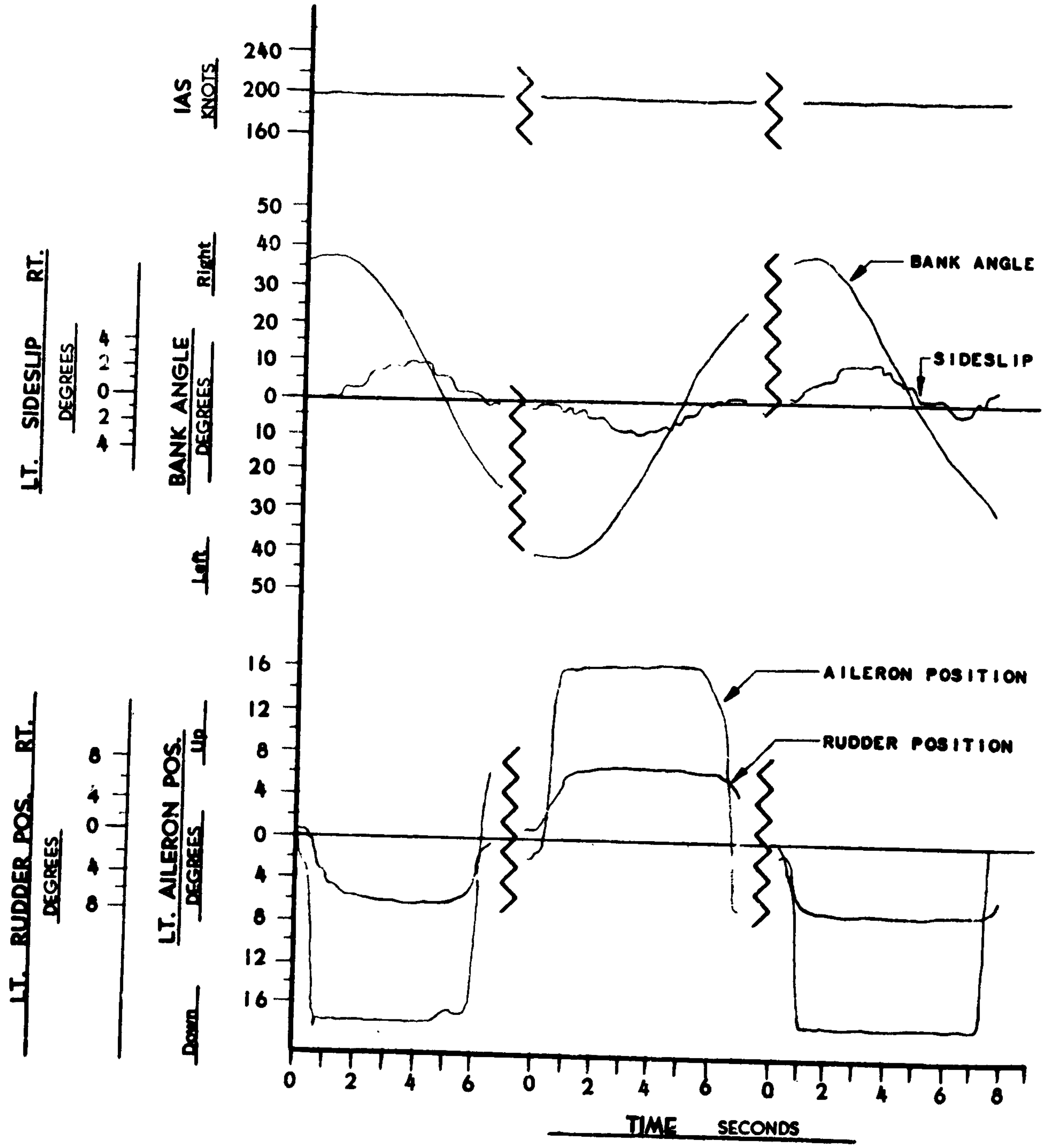


FIGURE NO. 412

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S. 128 KNOTS ; ALTITUDE 16,000 FEET
C.G. 34.1 % MAC; WEIGHT 234,500 LBS.
AVG. N2 8400 RPM; RUDDER TAB 2.1 DEG. T. E. LT.
L. AIL. TAB 5. DEG. T. E. UP R. AIL. TAB. 1.2 DEG. T. E. DN.

R.H. SPOILERS INOPERATIVE; EXT. TANKS INSTALLED

NOTE: AIRPLANE TRIMMED WITH LEFT SPOILERS DOWN
RUDDER PEDALS FIXED DURING ROLL

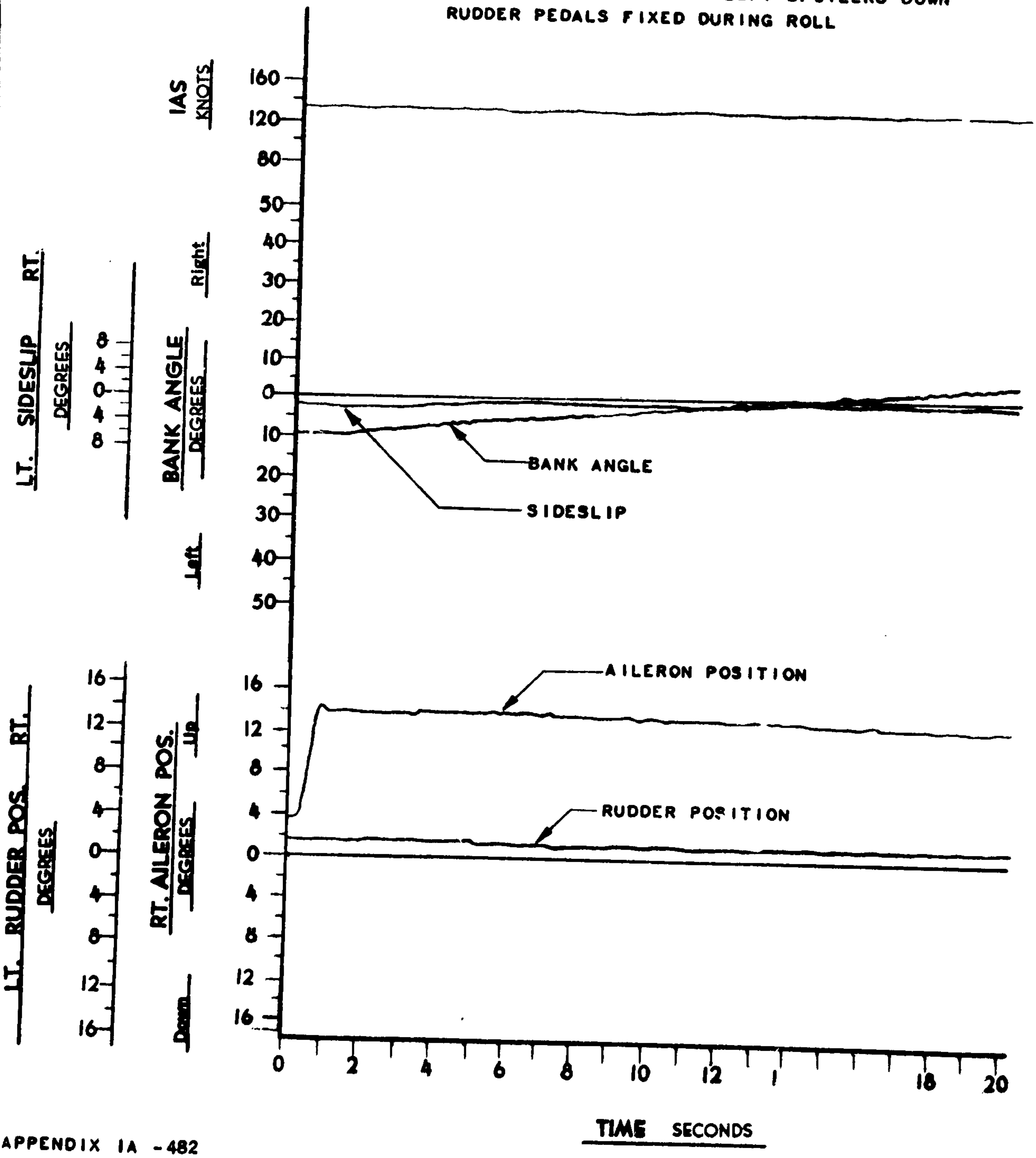


FIGURE NO. 413

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S.	128.5	KNOTS;	ALTITUDE	16,000	FEET
C.G.	34.1	% MAC;	WEIGHT	234,000	LBS.
AVG. N_2	8400	RPM;	RUDDER TAB	9.4 DEG. T. E. LT.	
L. AIL. TAB 5.	DEG. T. E. UP		R. AIL. TAB. 1.2 DEG. T. E. DN.		

R.H. SPOILERS INOPERATIVE; EXT. TANKS INSTALLED

NOTE: AIRPLANE TRIMMED WITH LEFT SPOILERS #1 POSITION
FULL RUDDER TRIM IN DURING ROLL

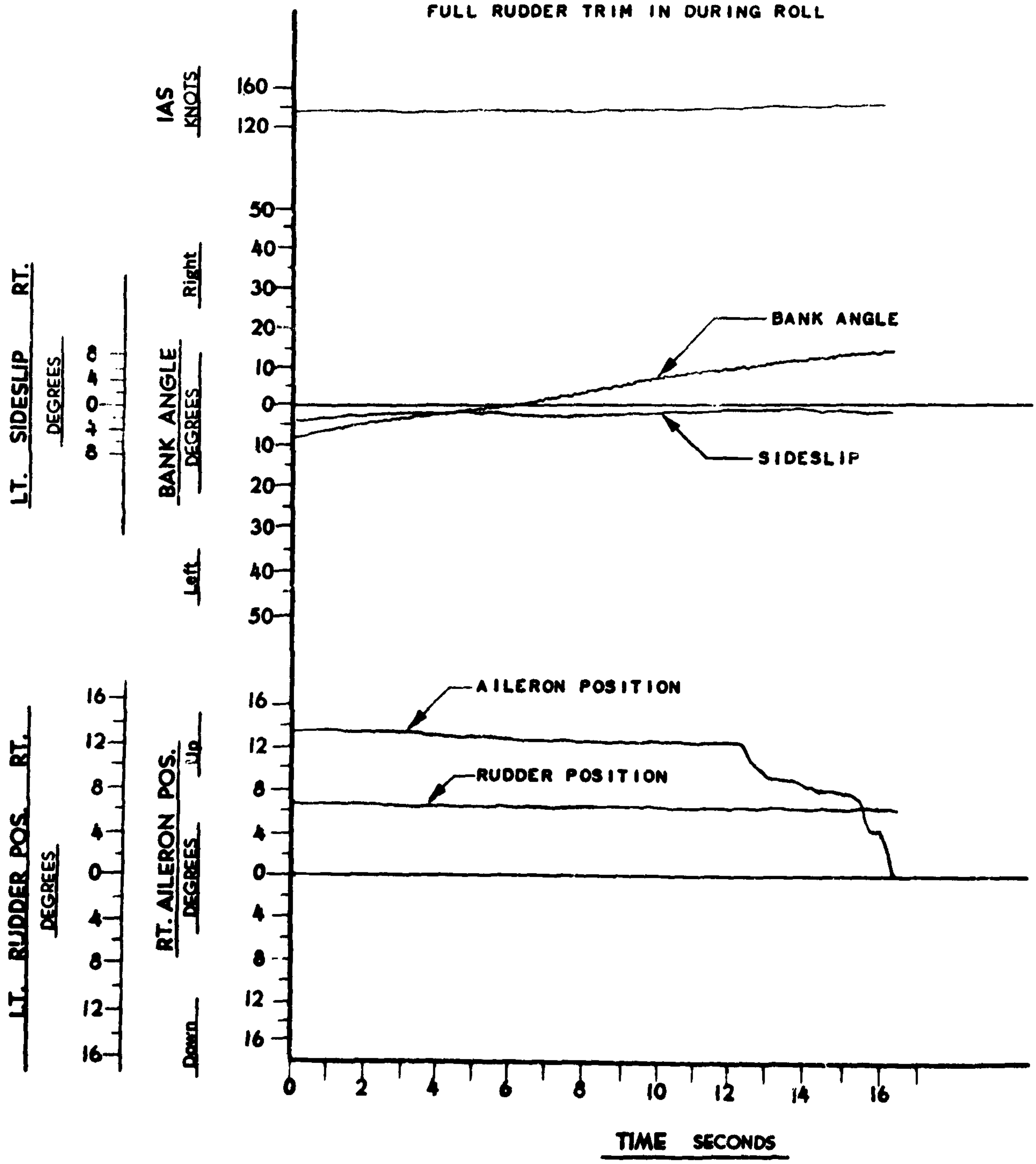


FIGURE NO. 414

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S.	128.5	KNOTS;	ALTITUDE	16,000	FEET
C.G.	34.1	% MAC;	WEIGHT	234500	LBS.
AVG. N2	8400	RPM;	RUDDER TAB	12.7	DEG. T. E. LT.
L. AIL. TAB	8.4	DEG. T. E. DN.	R. AIL. TAB.	12.2	DEG. T. E. UP

R.H. SPOILERS INOPERATIVE; EXT. TANKS INSTALLED

NOTE: AIRPLANE TRIMMED WITH LEFT SPOILERS DOWN
FULL RUDDER & RUDDER TRIM USED DURING ROLL

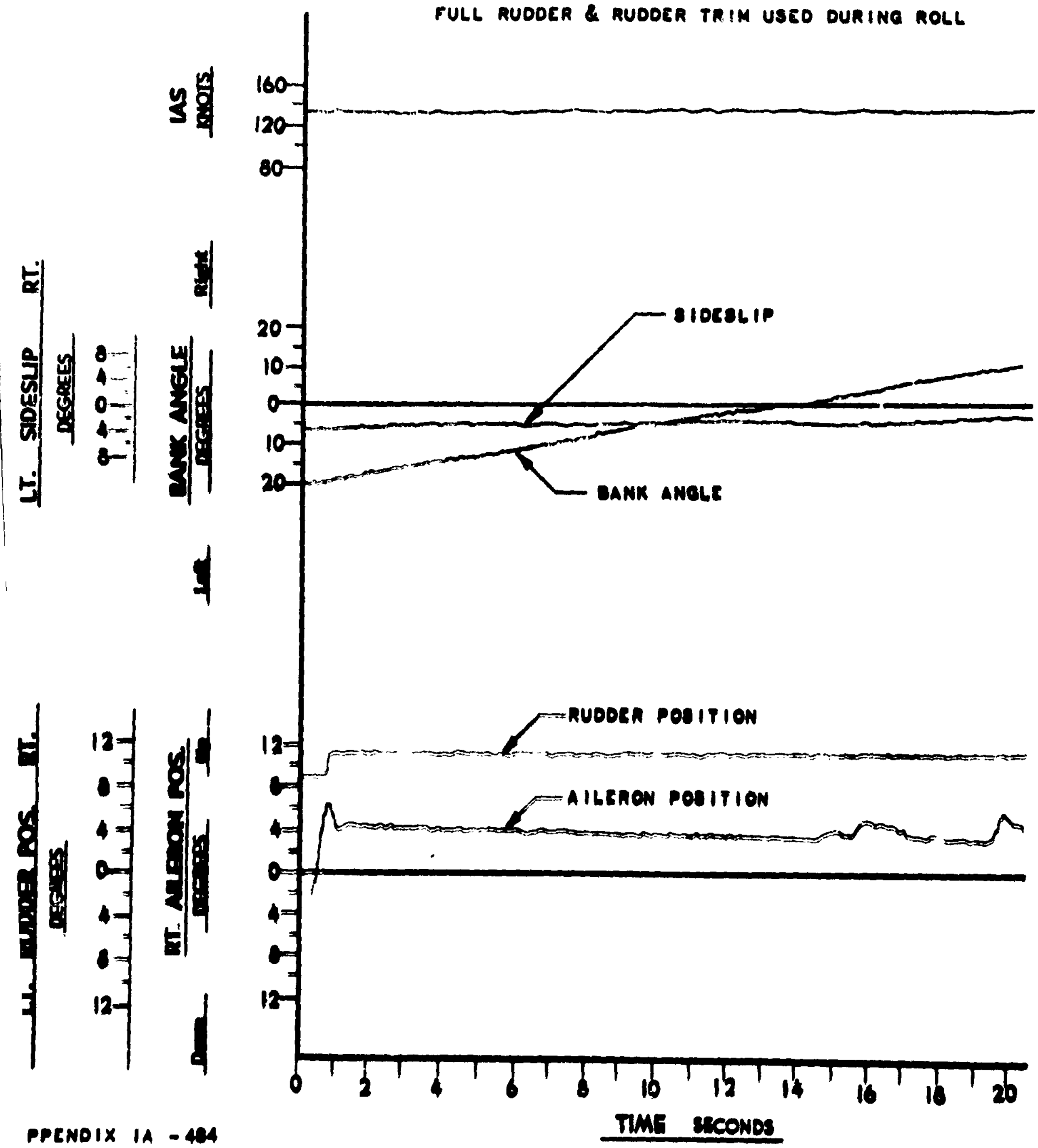


FIGURE NO. 415

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S.	128.5	KNOTS;	ALTITUDE	16 000	FEET
C.G.	34.1	% MAC;	WEIGHT	234 500	LBS.
AVG. N2	8400	RPM;	RUDDER TAB 12.7 DEG. T. E. LT.		
L. AIL. TAB 8.4 DEG. T. E. DN.;			R. AIL. TAB. 12.2 DEG. T. E. UP		

R.H. SPOILERS INOPERATIVE; EXT. TANKS INSTALLED

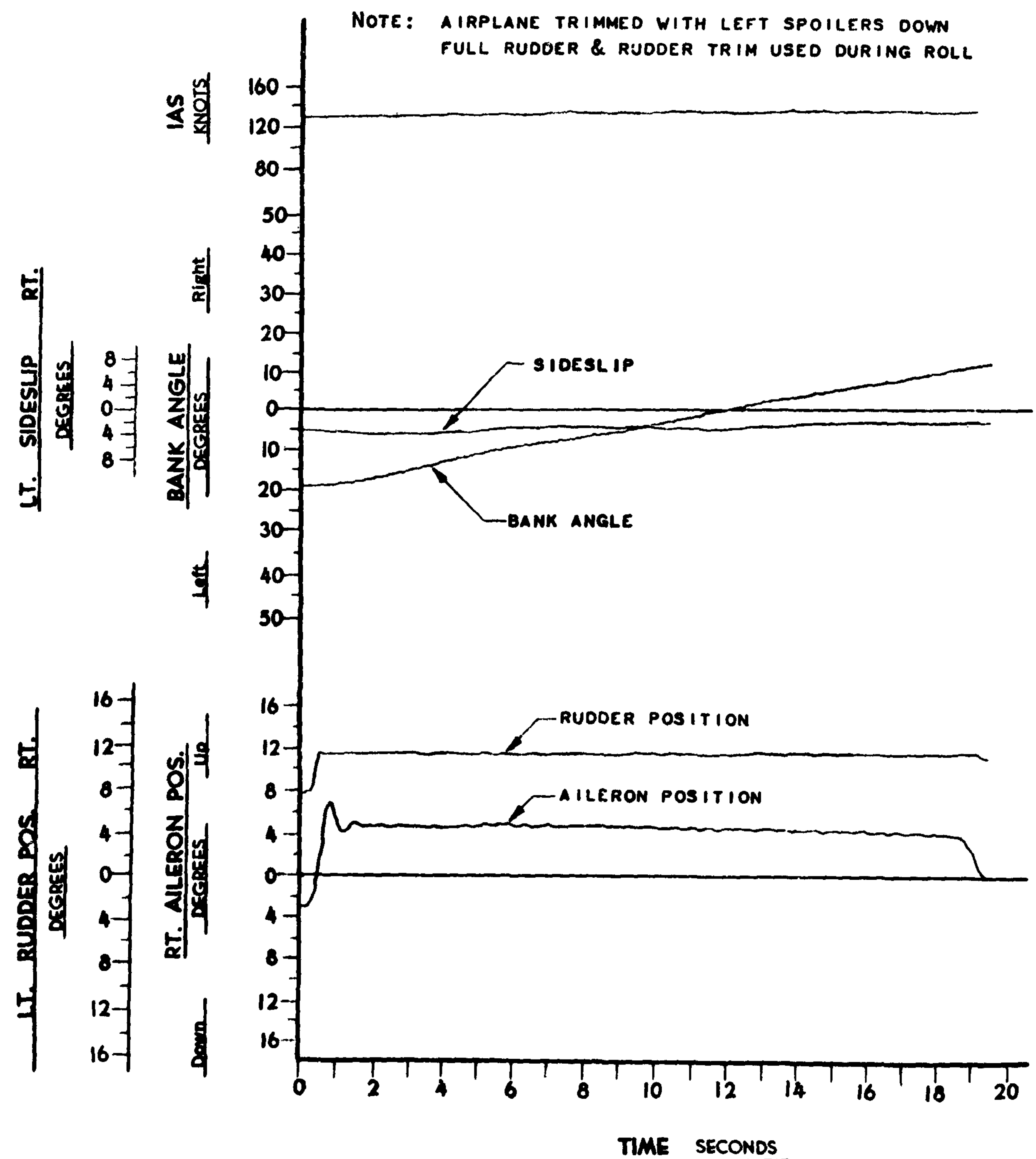


FIGURE NO. 416

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S.	160.5	KNOTS;	ALTITUDE	14,700	FEET
C.G.	32.7	% MAC;	WEIGHT	232,000	LBS.
AVG. N2	8430	RPM;	RUDDER TAB	0.9 DEG. T. E. LT.	
L. AIL. TAB	5.5 DEG. T. E. UP		R. AIL. TAB.	0.8 DEG. T. E. DN.	

R.H. SPOILERS INOPERATIVE; EXT. TANKS INSTALLED
FLAPS UP

NOTE: AIRPLANE TRIMMED WITH LEFT SPOILERS DOWN
RUDDER PEDALS FIXED DURING ROLL

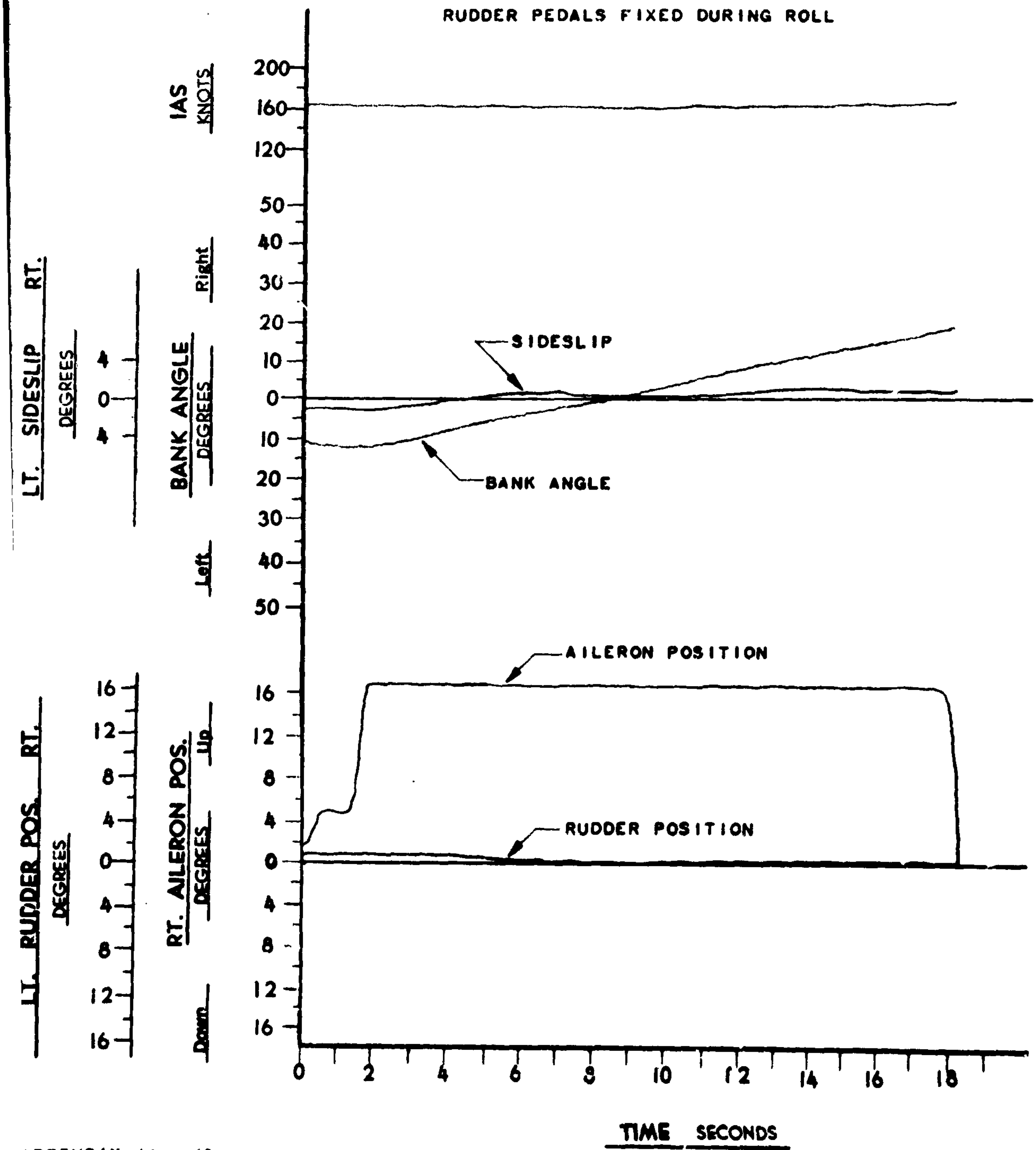


FIGURE NO. 417

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S. 160.5 KNOTS; ALTITUDE 14,700 FEET
C.G. 32.7 % MAC; WEIGHT 232,000 LBS.
AVG. N_2 8430 RPM; RUDDER TAB 10.9 DEG. T. E. LT.
L. AIL. TAB 3.6 DEG. T. E. DN. R. AIL. TAB. 8.4 DEG. T. E. UP

R.H. SPOILERS INOPERATIVE; EXT. TANKS INSTALLED
FLAPS UP

NOTE: AIRPLANE TRIMMED WITH LEFT SPOILERS DOWN
FULL RUDDER TRIM IN DURING ROLL

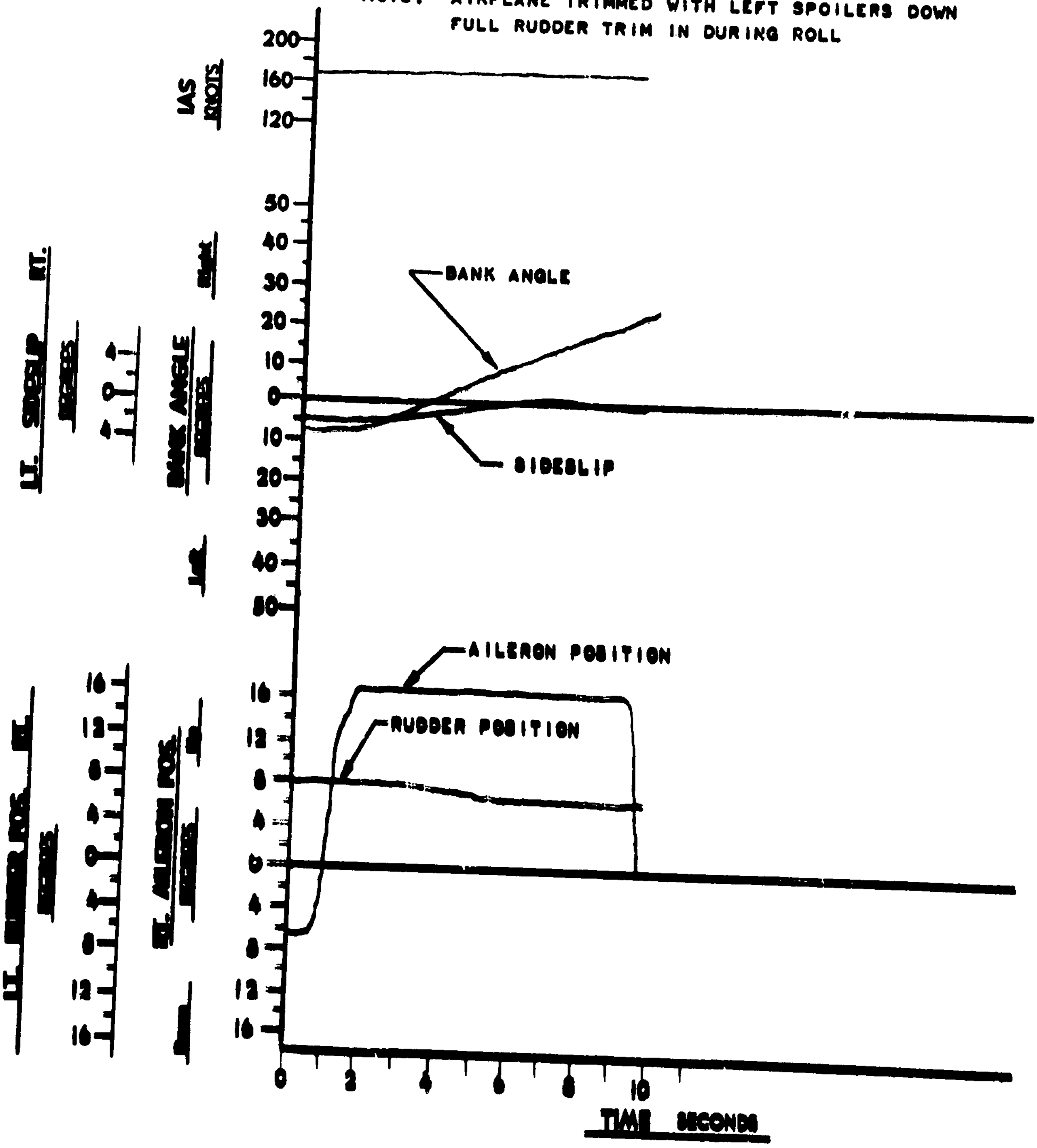


FIGURE NO. 418

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

B-52A, USAF NO. 52-003

POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S. 160.5	KNOTS;	ALTITUDE 14700	FEET
C.G. 32.7	% MAC;	WEIGHT 232000	LBS.
AVG. N_2 8430	RPM;	RUDDER TAB 11.2 DEG. T. E. LT.	
L. AIL. TAB 3.6 DEG. T. E. DN.		R. AIL. TAB. 8.4 DEG. T. E. UP	

R.H. SPOILERS INOPERATIVE; EXT. TANKS INSTALLED
FLAPS UP

NOTE: AIRPLANE TRIMMED WITH LEFT SPOILERS DOWN
FULL RUDDER & RUDDER TRIM USED DURING ROLL

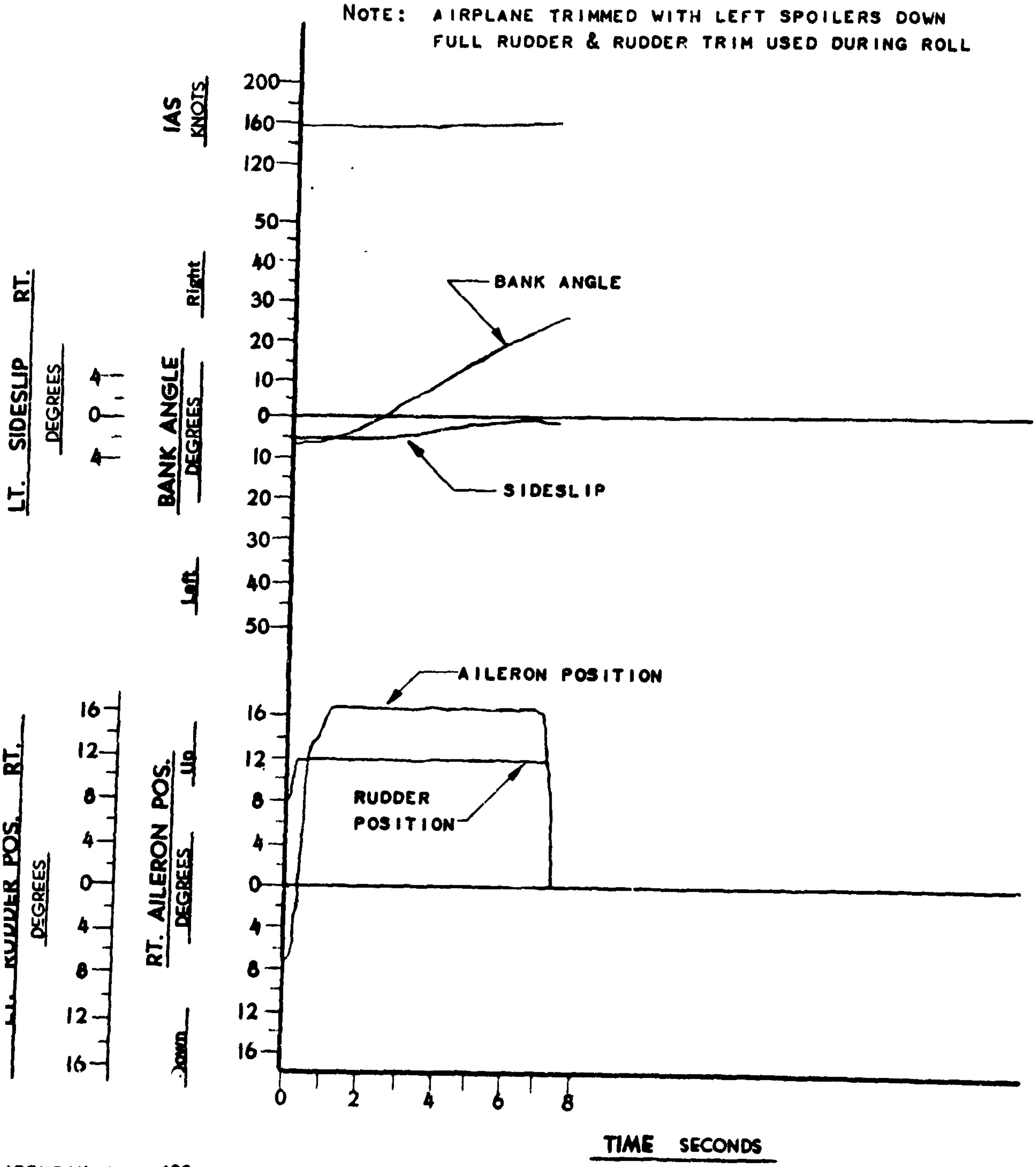


FIGURE NO. 419

TIME HISTORY OF MAXIMUM DEFLECTION AILERON ROLLS

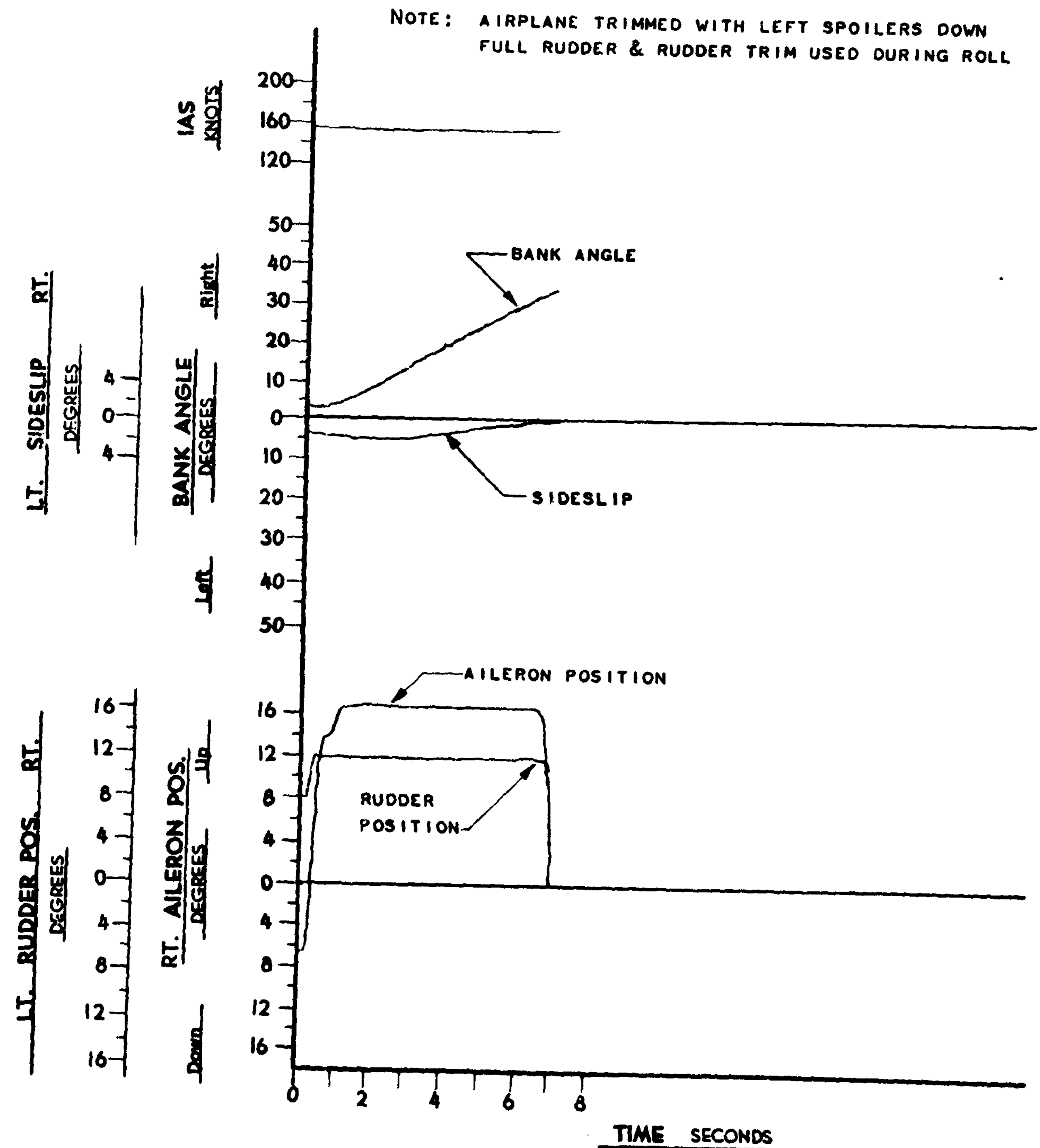
B-52A, USAF NO. 52-003

POWER APPROACH CONFIGURATION

TRIM CONDITIONS

C.A.S. 160.5 KNOTS; ALTITUDE 14700 FEET
C.G. 32.7 % MAC; WEIGHT 232000 LBS.
AVG. N2 8430 RPM; RUDDER TAB 11.2 DEG. T. E. LT.
L. AIL. TAB 4.3 DEG. T. E. DN. R. AIL. TAB. 9.1 DEG. T. E. UP

R.H. SPOILERS INOPERATIVE; EXT. TANKS INSTALLED
FLAPS UP



APPENDIX II

GENERAL INFORMATION

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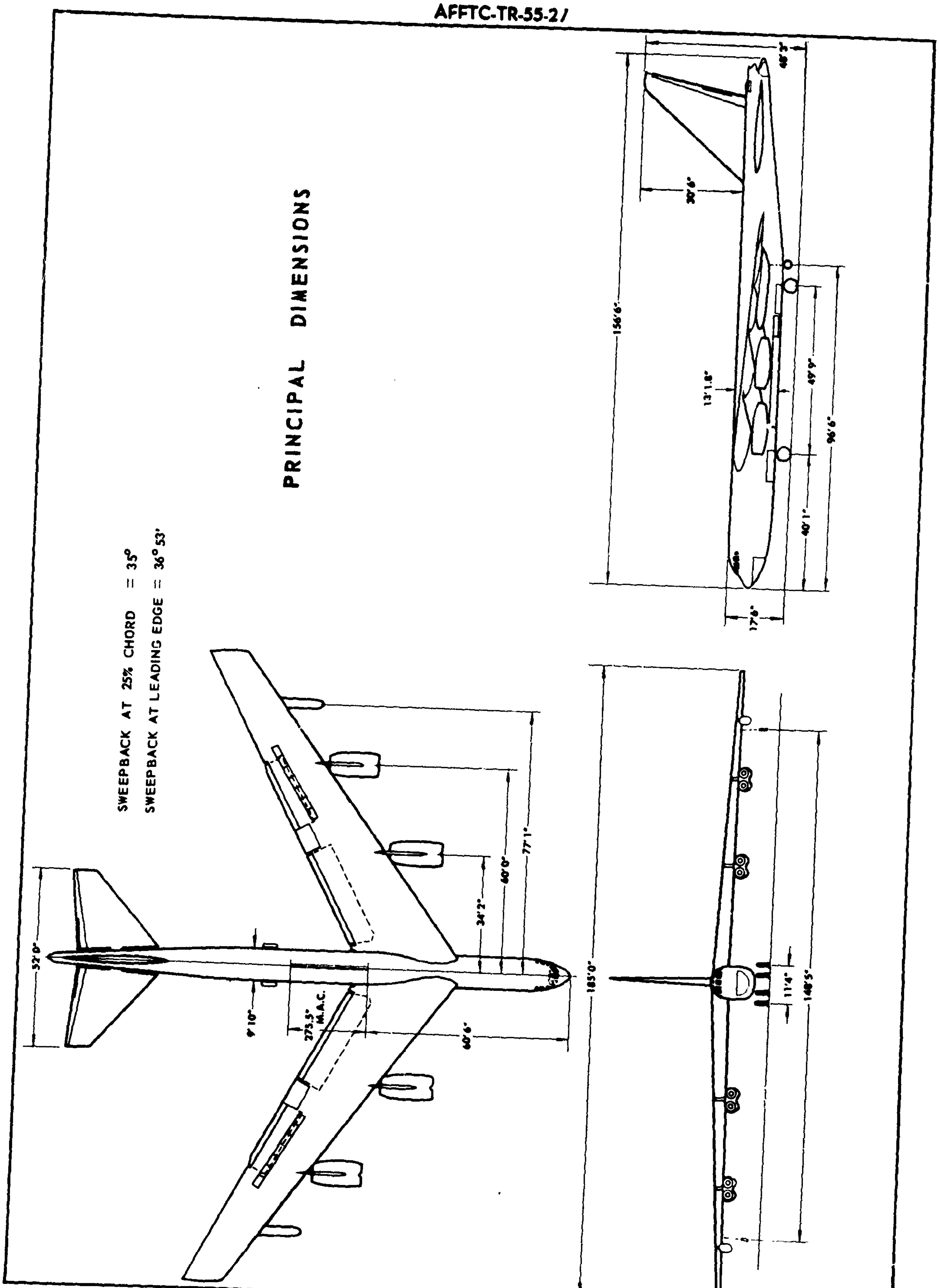

PRINCIPAL DIMENSIONS
SWEEPBACK AT 25% CHORD = 35°
SWEEPBACK AT LEADING EDGE = 36° 53'
156'6"
30'6"
13'1.8"
49'9"
96'6"
40'1"
17'6"
32'0"
9'10"
275.5" M.A.C.
60'6"
34'2"
60'0"
77'1"
185'0"
11'4"
148'5"

DIMENSIONS AND DESIGN DATA

GENERAL

Span	185 Feet
Overall Length	156 Feet 6.9 Inches
Overall Height (At Vertical Fin)	48 Feet 3.6 Inches
Overall Height (Fin Folded)	240 Inches
Inboard Nacelle Minimum Ground Clearance (Design Gross Weight)	76 Inches
Outboard Nacelle Minimum Ground Clearance (Design Gross Weight)	56.2 Inches
External Fuel Tank Minimum Ground Clearance (Design Gross Weight)	51 Inches
Design Gross Weight	390,000 Pounds
Design Weight Empty	161,030 Pounds
Useful Load (Design Gross Weight)	228,970 Pounds
Maximum Alternate Gross Weight (Ground Handling)	406,000 Pounds
Maximum Alternate Gross Weight (Flight)	405,000 Pounds
Maximum Weight - No Drop Tanks (Flight)	371,000 Pounds

WING

Type	High
Root Chord	371 Inches
Tip Chord	148 Inches
Mean Aerodynamic Chord	275.5 Inches
Airfoil Section	
Root	BAC 233
Tip	BAC 236
Angle of Incidence	6 Degrees
Angle of Sweepback (At 1/4 Chord)	35 Degrees
Angle of Dihedral	2.5 Degrees
Aspect Ratio	8.55

HORIZONTAL STABILIZER

Span	52 Feet
Root Chord	27 Feet 8.3 Inches
Tip Chord	6 Feet 11 Inches
Mean Aerodynamic Chord	232.62 Inches
Angle of Sweepback (At 1/4 Chord)	35 Degrees
Angle of Dihedral	0 Degrees
Aspect Ratio	3.0

VERTICAL FIN

Height	30 Feet 6 Inches
Chord (Maximum)	25 Feet 2 Inches
Tip Chord	5 Feet
Mean Aerodynamic Chord	207.96 Inches
Angle of Sweepback (1/4 Chord)	35 Degrees
Aspect Ratio	2.02

FUSELAGE

Maximum Width		9 Feet 10 Inches
Maximum Height		17 Feet 5.8 Inches
Overall Length		156 Feet 6.9 Inches
Height of Forward Entry Door Above Ground		4 Feet 9 Inches
Height of Aft Entry Door Above Ground		9 Feet 4 Inches
Dimensions of Doors	Forward Entry Door Width	34 Inches
	Forward Entry Door Length	50 Inches
	Aft Entry Door Width	24 Inches
	Aft Entry Door Length	29 Inches

AREAS

Wing (Less Ailerons)	3923 Sq. Ft.
Ailerons (Total, Including Tabs)	77 Sq. Ft.
Aileron Tabs (Total)	18 Sq. Ft.
Horizontal Stabilizer (Including Elevators)	900 Sq. Ft.
Elevator (Total, Including Tabs)	79 Sq. Ft.
Elevator Tabs (Total)	6.8 Sq. Ft.
Vertical Fin (Including Rudder)	460 Sq. Ft.
Rudder (Including Tabs)	44.5 Sq. Ft.
Rudder Tabs (Total)	3.4 Sq. Ft.
Flaps (Total)	794 Sq. Ft.

LANDING GEAR

Wheel Size	
Quadricycle Wheels, Front Main and Rear Main	56 x 16 Type VIII
Tip Protection	32 x 8.8
Tire Size	
Quadricycle Wheel, Front Main and Rear Main	56 x 16 Type VII
Tip Protection	32 Inched Dia. x 8.8
Tread of Main Wheels	11 Feet 4 Inches Max.
Wheel Base	49 Feet 9 Inches

LANDING GEAR (continued)

Vertical Travel of Axle from Extended To Fully Compressed Position:

Main Wheels	18 Inches
Tip Protection Wheel	20.5 Inches

CONTROL SURFACE AND CORRESPONDING CONTROL MOVEMENTS

Control Surface and Control Movements on Each Side of Neutral Position For No Load Full Movement as Limited by Surface Stops

Rudder: 20 Degrees Right, 20 Degrees Left

Rudder Pedals: 3.76 Inches Forward, 3.76 Inches Aft

Rudder Tab or Trim Surface: 20 Degrees Right, 20 Degrees Left

Rudder Tab or Trim Surface Control: 6.5 Turns for 40° of Tab or Trim Surface Movement

Elevators: 20 Degrees Above, 20 Degrees Below

Elevator Control: 7.5 Inches Aft, 7.5 Inches Forward

Elevator Tab: 20 Degrees Above, 20 Degrees Below

Ailerons: 18 Degrees Above, 18 Degrees Below

Aileron Control Wheel: 85 Degrees Right, 85 Degrees Left

Aileron Spring Tab: 18 Degrees Above, 18 Degrees Below

Aileron Trim Tab: (Electrically Operated) 14° Above, 14° Below

Stabilizer Wheel: 13 Turns for 13 Degrees of Stabilizer Movement

Wing Flap: (Maximum) 35° Movement

Wing Flap Control: 40 Degrees for 35 Degrees of Flap Movement

Speed Brake Control 62 Degrees for 60 Degrees of Speed Brake

Spoilers: 60 Degrees Up (Hydraulically Operated)

OPERATIONAL LIMITATIONS:

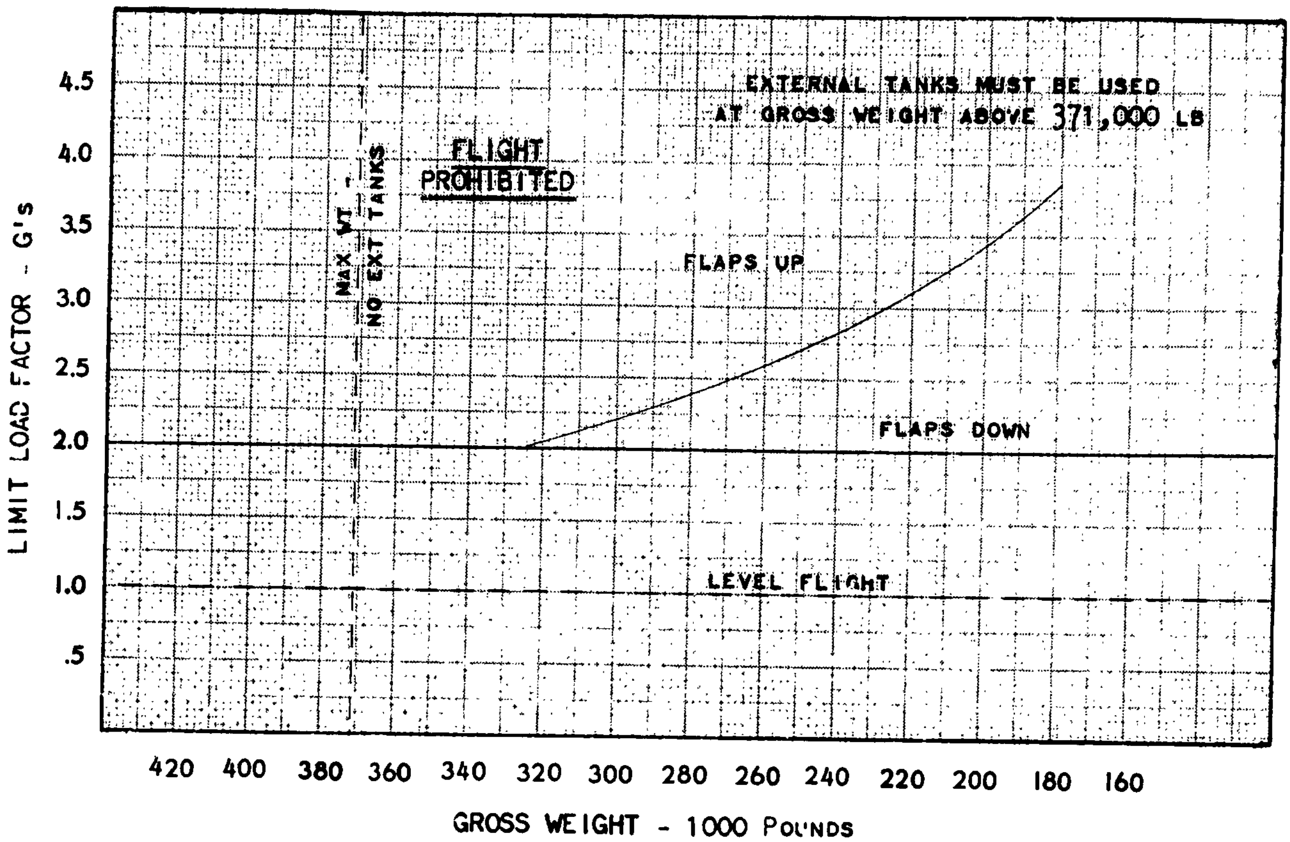
Design Gross Weight	390,000 Pounds
Design Weight Empty	161,030 Pounds
Useful Load (Design Gross Weight)	228,970 Pounds
Maximum Alternate Gross Weight (Ground Handling)	406,000 Pounds
Maximum Alternate Gross Weight (Flight)	405,000 Pounds
Maximum Weight - No Drop Tanks (Flight)	371,000 Pounds

FLIGHT LIMITS:

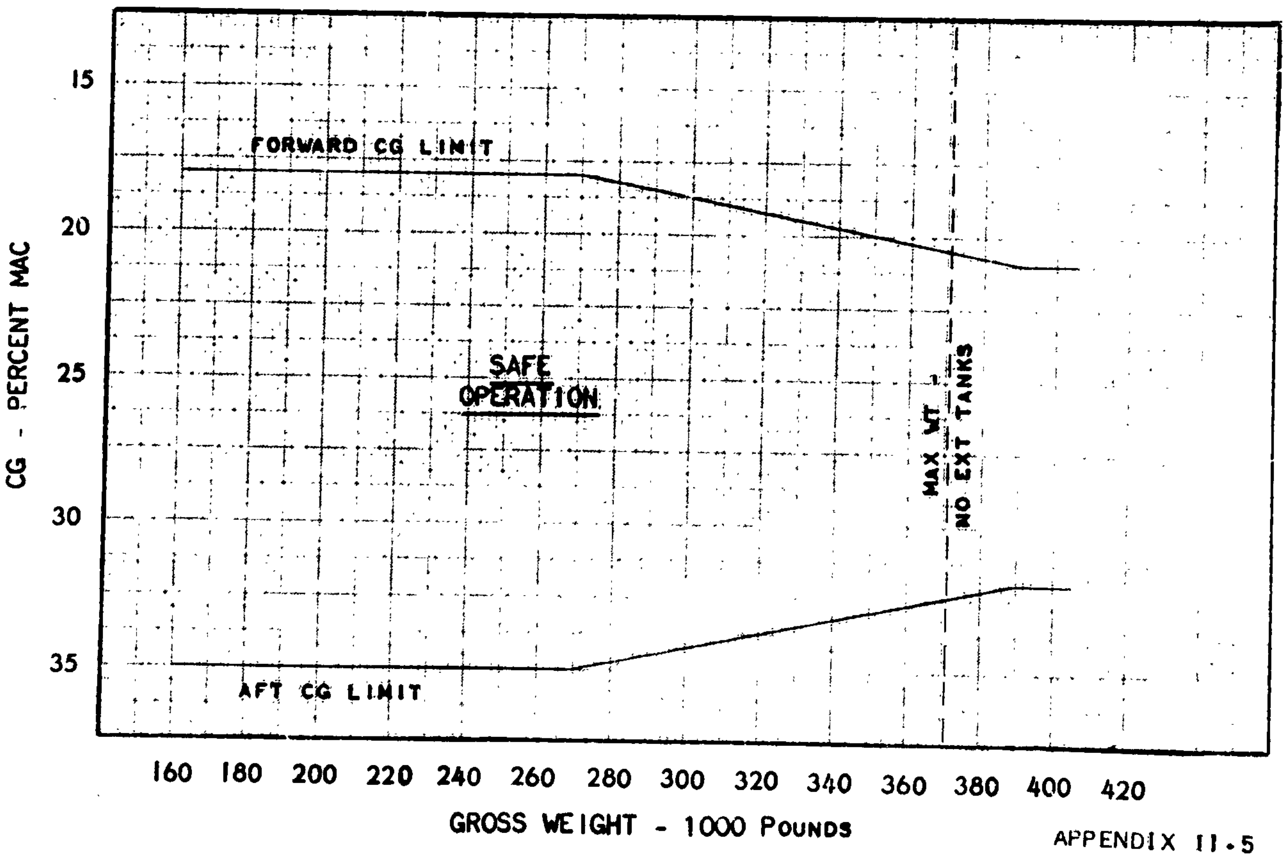
Gear and Flaps Up	Ve = 400 Knots (Max.S.L. To 20,000 Feet)
Flaps Down	Ve = 170* Knots
Gear Down	Ve = 305 Knots
Speed Brakes	No Restriction

*Design Limit Ve = 190 Knots

STRUCTURAL LIMITATIONS - LIMIT LOAD FACTOR



STRUCTURAL C.G. LIMITS



POWER PLANT:

Pratt & Whitney J57-P-1W:

Uninstalled Static Rating at Maximum Power	10,000 Pounds Dry
	11,400 Pounds With Water Injection
Installed Static Rating at Maximum Power	9,250 Pounds Dry

POWER PLANT LIMITATIONS:

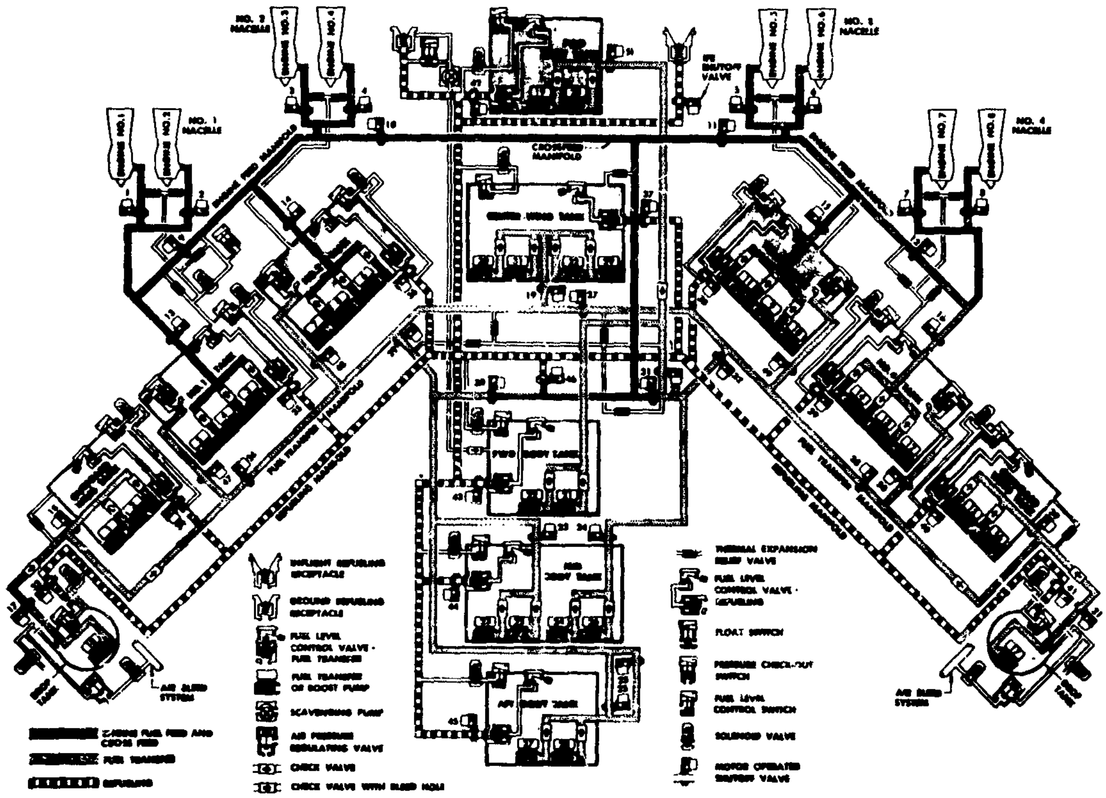
Operating Condition	Operating Limits					
	ROTOR SPEED % N_2*	MAXIMUM OBSERVED EXHAUST GAS TEMP. °C SL to 35,000'	55,000'***	TIME LIMIT (MINUTES)	OIL PRESSURE PSIG NORMAL	OIL TEMPERATURE °C RANGE
Take-Off ** (Water Injection)	100	600		5	45 ±5	70-120
Maximum	100	600		5	45 ±5	70-120
Military	99.1	580	625	30	45 ±5	70-120
Normal Rated	96.9	540	575	Continuous	45 ±5	70-120
Cruise						
90% Normal Rated	95.4	510	540	Continuous	45 ±5	70-120
80% Normal Rated	93.9	490	520	Continuous	45 ±5	70-120
70% Normal Rated	92.4	460	490	Continuous	45 ±5	70-120
Idle	58-65	340			30 to 50	70-120
Starting		600	600			
Acceleration		625	625	2	45 ±5	70-120

* RPM values are based on a Compressor Inlet Temperature of 15°C.

** To be used for take-off only.

*** Between 35,000 and 55,000 Feet, temperature limits vary linearly with altitude.

FUEL SYSTEM



FUEL FLOW DIAGRAM

The Fuel System Consists of Thirteen Fuel Tanks with Estimated and Calibrated Capacities as Follows:

Tank	Usable Fuel (Gallons)	Estimated Volume (Gallons)	Calibrated Volume (Gallons)
#1 Main	2300	2310	2348
#2 Main	2750	2759	2790
#3 Main	2750	2759	2770
#4 Main	2300	2310	2362
Outboard L.H.	2300	2318	2235
Outboard R.H.	2300	2318	2236
Center Wing	5625	5644	5490
Forward Body #1	2325	2335	2410
Forward Body #2	1928	1935	1990
Mid Body	5000	5015	5100
Aft Body	5800	5810	5950
External L.H.	1000	1010	972
External R.H.	1000	1010	963

The fuel system is divided into three independent fuel supplying systems and an engine fuel control system for each engine. The engine fuel control systems receive fuel, under boost pump pressure, from a fuel feed system which contains the four main tanks. The main tanks are supplied fuel from auxiliary tanks by a fuel transfer system. A completely separate refuel system is provided which will route fuel to all tanks from a single-point ground refueling receptacle or an air refueling receptacle.

During normal fuel system operation, each nacelle is supplied fuel from its respective main tank in the wing. These main tanks, the fuel lines to the nacelles, and the crossfeed manifold between the nacelles comprise the fuel feed system.

All normal replenishing of the fuel in the main tanks from the auxiliary tanks during flight is accomplished by use of a fuel transfer system. The transfer system is provided separate lines from each auxiliary tank to a transfer manifold. From the transfer manifold a replenishing line goes to each main tank. The fuel level in the main tanks is automatically maintained by a primary and secondary fuel level control valve at the termination of the transfer line to each main tank.

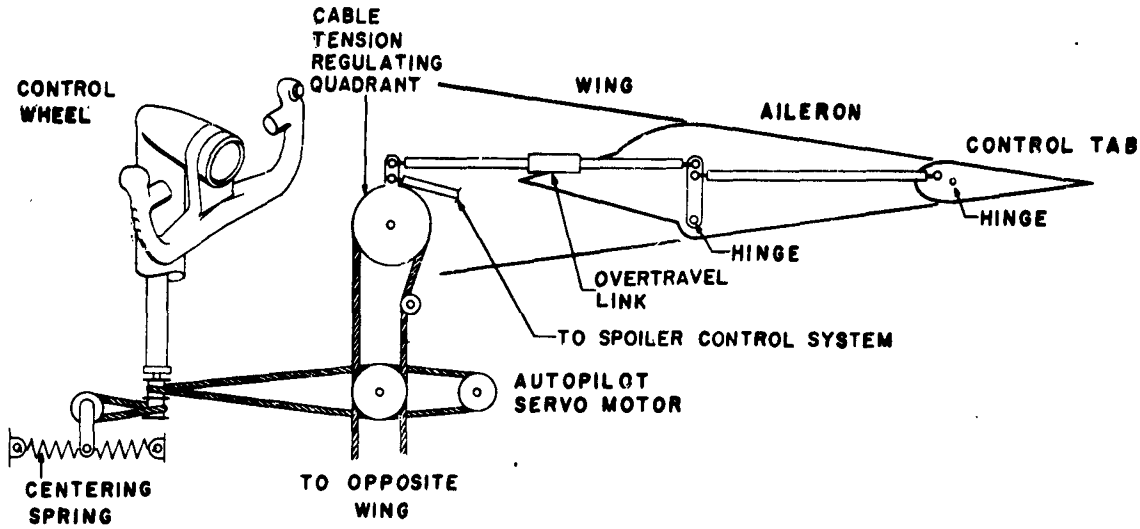
FLIGHT CONTROL SYSTEMS

Primary flight control of the airplane is accomplished by the ailerons, elevators and rudder. These surfaces are free floating during most of their travel. They are moved by control tabs which are connected by cables to dual control columns and rudder pedals at the pilots' stations. Lateral control is augmented by spoilers.

Lateral trim is provided by a trim tab on each aileron; pitch trim is accomplished by moving the entire horizontal stabilizer; and directional trim by resetting a centering mechanism in the rudder control tab cable system.

No internal or external surface locks are provided for the flight controls. To prevent damage due to gusts, hydraulic dampers have been provided for each primary surface. These dampers are completely self contained and automatic in operation. They will prevent damage to the flight controls from gusts up to 65 knots. Their damping action is not felt during normal flight control movements.

AILERON CONTROL SYSTEM

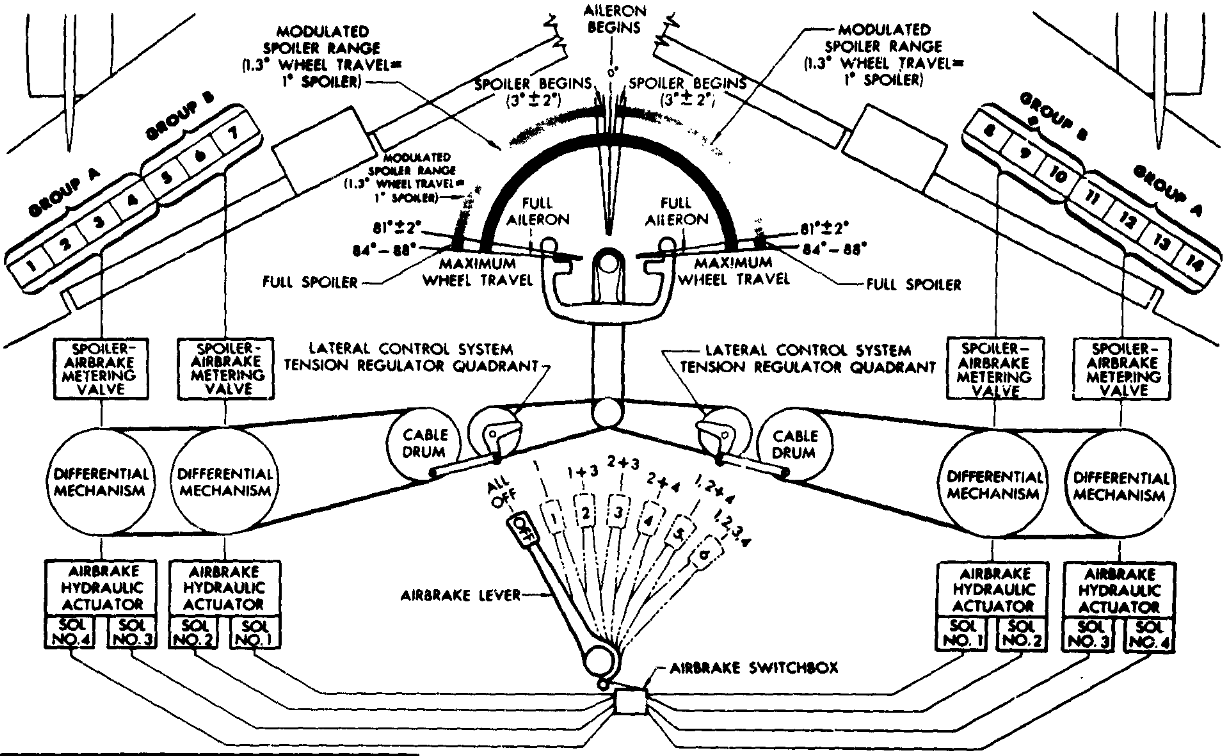


AILERON CONTROL SYSTEM SIMPLIFIED DIAGRAM

All lateral control, except for aileron trim, is initiated through rotation of the control wheels. This rotation mechanically operates the aileron control tabs and mechanically positions the hydraulic valves to operate the spoilers.

Centering springs in the aileron cable system center the control wheels and provide aileron feel. Overtravel links in each of the lateral control systems are provided as safety devices so that j[illegible]ng of any lateral control system will not prevent operation of the unjammed systems.

SPOILER - AIRBRAKE CONTROL SYSTEM



AIRBRAKE POSITION	SOLENOIDS ENERGIZED	POSITION OF GROUP A	POSITION OF GROUP B
OFF	NONE	DOWN	DOWN
1	1	0°	20°
2	1+3	20°	20°
3	2+3	20°	40°
4	2+4	40°	40°
5	1, 2+4	40°	60°
6	1, 2, 3, 4	60°	60°

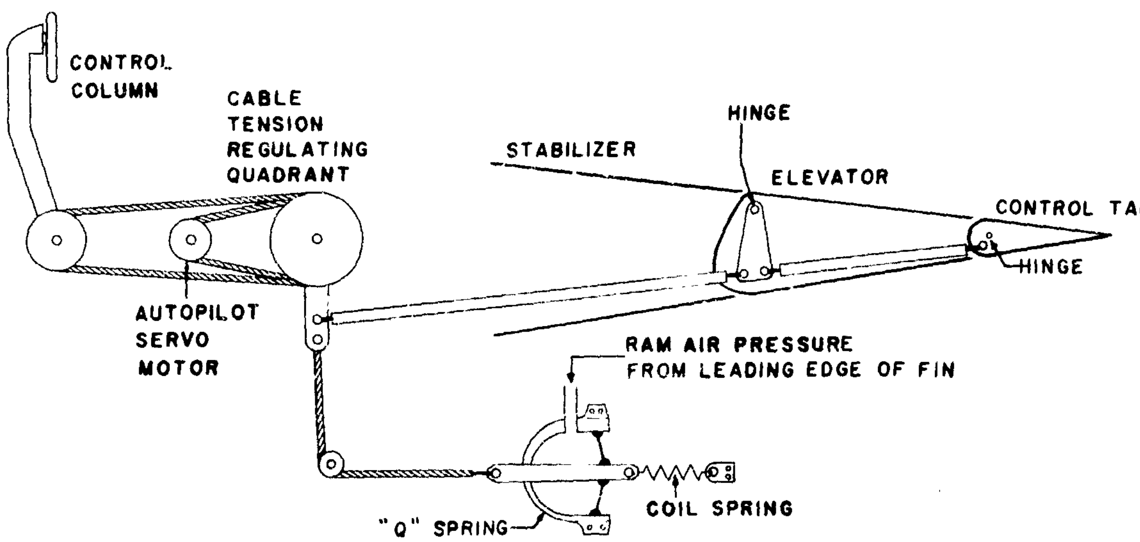
SPOILER-AIRBRAKE DIAGRAM

Seven spoilers are provided on each wing. These spoilers are hinged to the wing at the leading edge of the spoiler and each is pivoted upward into the airflow over the wing by an individual actuator.

When used for lateral control, the spoilers are fully modulating (moving in proportion to control wheel rotation). Spoiler actuation is initiated by control wheel rotation which mechanically opens hydraulic metering valves to supply pressure to the spoiler actuators. A mechanical follow-up system automatically returns the metering valves to the closed position when the spoilers have reached the position called for by the control wheels. In case of hydraulic failure, the spoilers are returned to the down position by air loads and spoiler down springs. At airspeeds above approximately 250 knots, the spoiler actuators do not have sufficient force to raise the spoilers to the full up position.

The spoilers on both wings can be raised simultaneously as airbrakes for use during letdown and landing. Raising the spoilers as airbrakes is controlled by an airbrake lever which electrically controls solenoid valves and hydraulic actuators at each spoiler differential unit. The airbrake actuators reset the spoiler differential units so that the spoiler metering valves will be simultaneously opened to symmetrically raise the spoilers. Full spoiler acutation for lateral control is available when the spoilers are raised as airbrakes.

ELEVATOR CONTROL SYSTEM

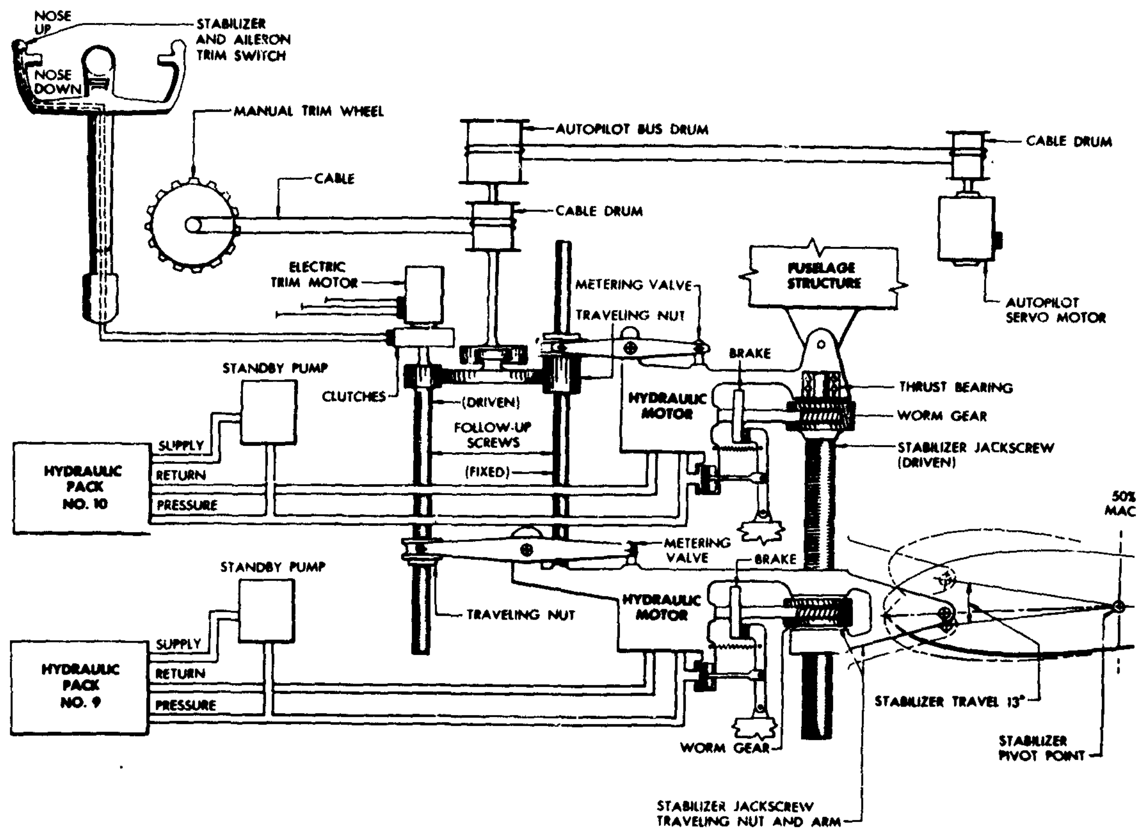


ELEVATOR CONTROL SYSTEM SIMPLIFIED DIAGRAM

The elevators are control tab operated floating surfaces. The control tabs are cable operated from the pilots' control columns.

Elevator feel and centering is provided by an elevator "Q" spring in the cable system. This device is a bellows to which ram air pressure from the leading edge of the fin is ducted. The bellows resists elevator control tab deflections in proportion to dynamic pressure and control deflection and simulates air loads on a conventional elevator system.

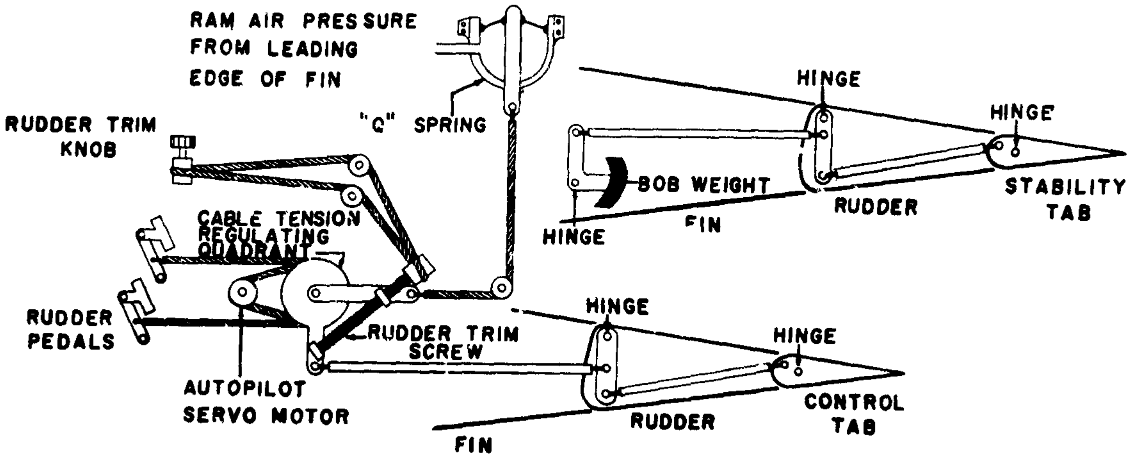
STABILIZER TRIM CONTROL



STABILIZER TRIM CONTROLS SCHEMATIC

Pitch trim of the airplane is accomplished by hydraulically moving the entire horizontal stabilizer. The leading edge of the stabilizer is raised and lowered by a jack driven by two hydraulic motors. The metering valves for these two motors are controlled by a cable system terminating in trim wheels and indicators on the aisle stand, and are also controlled by a parallel electric trim control system. Either motor is capable of driving the jack independently in case the other fails. If the jack fails to drive hydraulically, it can be hand cranked for the desired trim.

RUDDER CONTROL SYSTEM



RUDDER CONTROL SYSTEM SIMPLIFIED DIAGRAM

All directional control and directional trim is accomplished by the rudder control system. The rudder is a control tab operated floating surface. The control tab is cable operated from the pilots' rudder pedals.

Rudder feel and centering is provided by a rudder "Q" spring in the cable system. This "Q" spring obtains ram air pressure from the leading edge of the vertical fin and operates in the same manner as the elevator "Q" spring.

The rudder is moved by a stability tab as well as a control tab. This stability tab is the upper of the two tabs on the rudder. It is moved by a bob weight directional damper which is a self contained, automatic unit in the fin immediately in front of the stability tab.

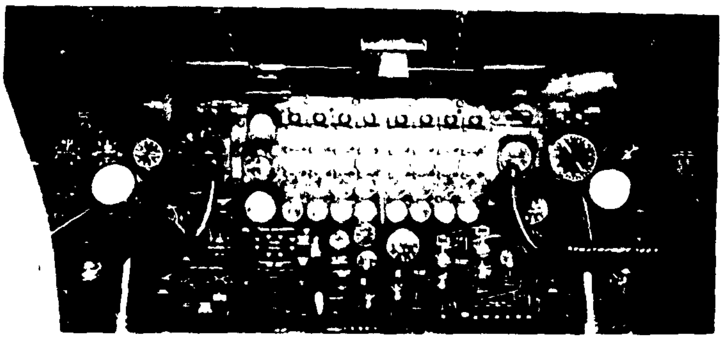
Rudder trim is accomplished by resetting the centering action of the rudder "Q" spring on the rudder control tab cable system. The trim linkage is set by a screw acting on the "Q" spring linkage. This screw is cable operated by the rudder trim knob on the aisle stand.

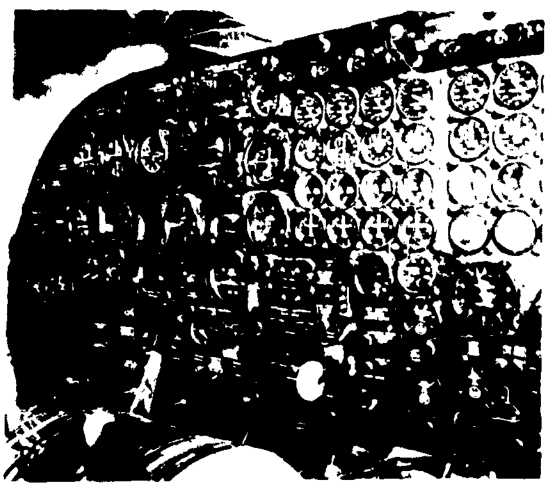
The internal aerodynamic balance panel which is attached to the leading edge of the rudder was modified to counteract divergent directional damping tendencies. This modification consisted of removal of that part of the regulator plugs which restricted air flow through the panel when the rudder was approximately 15 degrees on either side of the faired position.

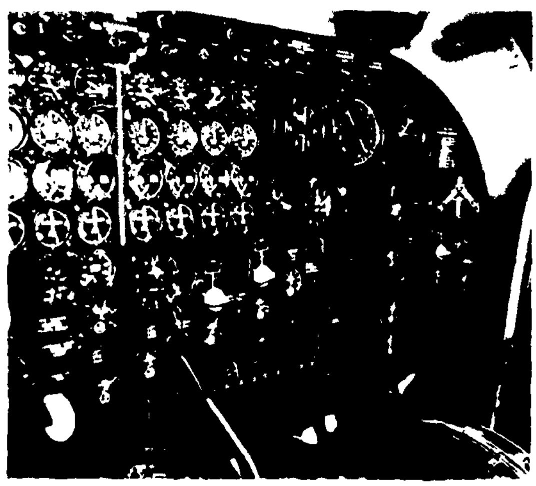
TEST INSTRUMENTATION

Complete instrumentation for performance and stability and control testing were delivered to the contractor and installed in the test aircraft. All instrument calibrations were accomplished by the contractor and were spot-checked by Air Force personnel before, during, and after the test program. Recording devices were installed in the airplane as shown on Page 20. The location of the test instrumentation was as follows:

PILOT'S PANEL AND COPILOT'S PANEL







PILOT'S PANEL

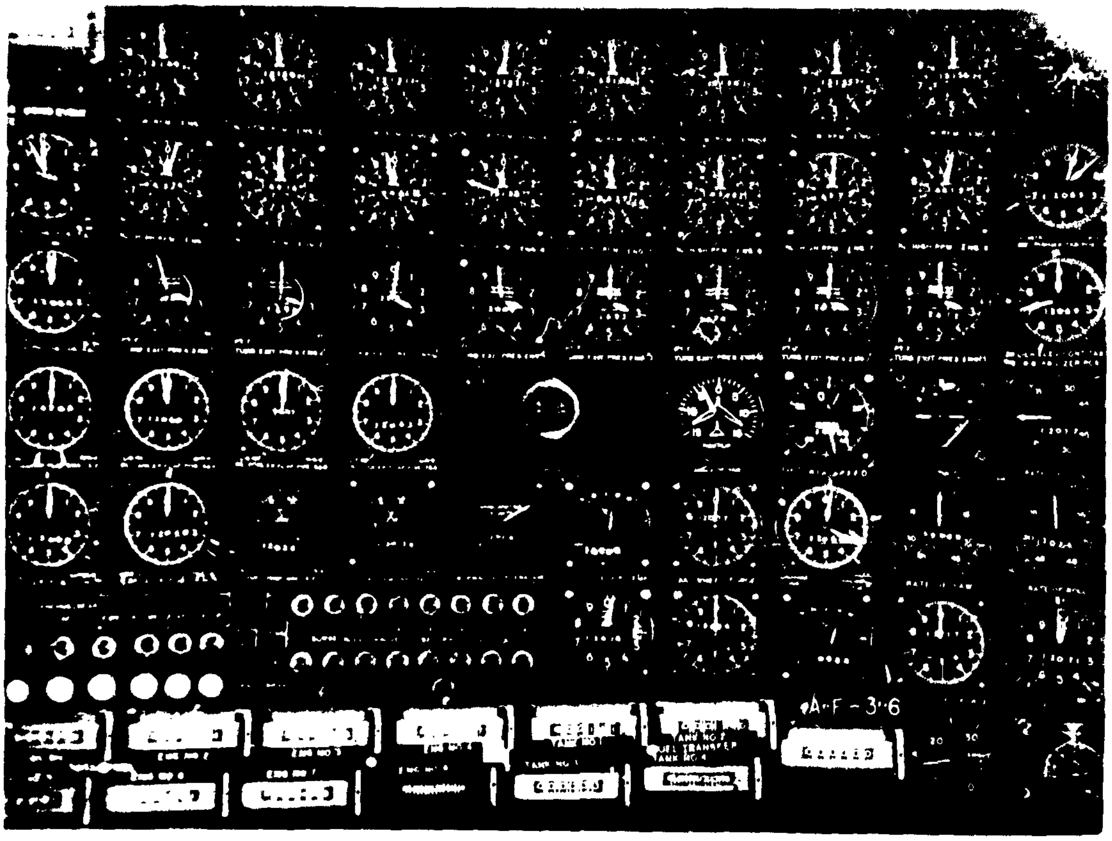
Airspeed (Pilot's System)
Altimeter
Outside Air Temperature
Engine RPM (High Pressure Rotor Speed, N_2, All Engines)
Exhaust Gas Temperature (All Engines)
Sideslip Differential Pressure
Elevator Control Force
Aileron Control (Wheel) Position
Accelerometer
Wing Flap Position
Cabin Altitude
Angle of Yaw (Airstream Direction Detector)
Angle of Attack (Airstream Direction Detector)
Coordination Counter
Condition Light
Event Light

COPILOT'S PANEL

Airspeed (Copilot's System)
Altimeter
Outside Air Temperature
Engine RPM (High Pressure Rotor Speed, N_2, All Engines)
Exhaust Gas Temperature (All Engines)
Oil Pressure (All Engines)
Fuel Quantity Tank and Total
Total Fuel Flow
Cabin Altitude
Control Light

PHOTORECORDER

The photorecorder is equipped with two 35 MM movie cameras and a two way mirror which allows the test engineer to observe the instrumentation during flight.

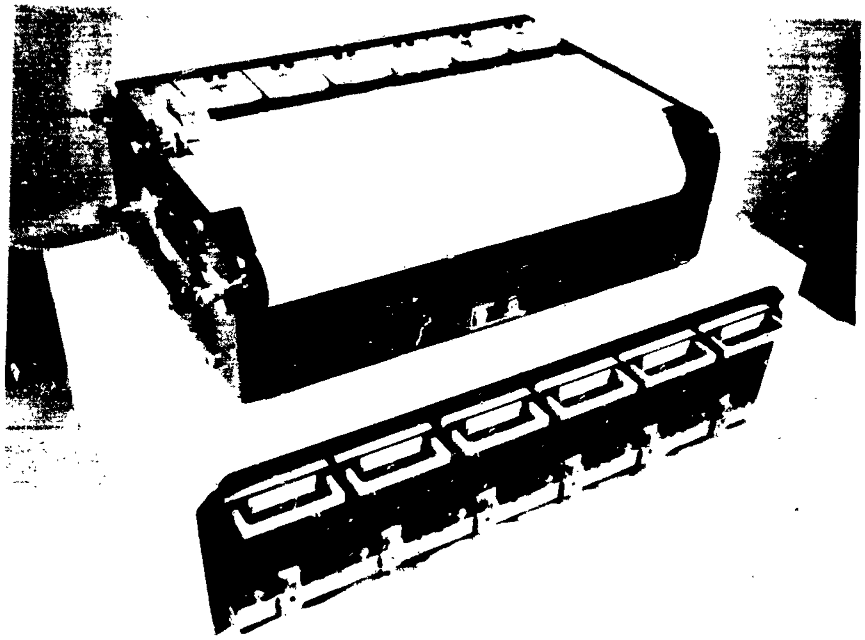


Engine RPM (High Pressure Rotor Speed, N_2, All Engines)
Engine RPM (Low Pressure Rotor Speed, N_2, All Engines)
Turbine Exit Pressure (All Engines)
Oil Cooler Flap Position (All Engines)
Fuel Totalizers (All Engines)
Fuel Transfer Totalizers (4 Main Tanks)
Airspeed (Pilot's System)
Altimeter
Outside Air Temperature
Angle of Attack (Airstream Direction Detector)
Angle of Yaw (Airstream Direction Detector)
Attitude Gyro
Left and Right Aileron Trim Tab Positions
Left and Right Aileron Control Tab Positions
Rudder Pedal Force
Aileron Wheel Force
Elevator Force
Accelerometer
Elevator Quadrant Position
Elevator Tab Position
Forward Rudder Quadrant Position
Rudder Tab Positions
Stabilizer Position
Spoiler Position
Rate of Roll
Rate of Yaw
Rate of Pitch
Drag Chute Release - Light
Landing Gear Position - Lights
Unstick Indicator - Light
Clock
Stop Watch
Coordination Counter
Surge Bleed Valve Position Indicator (Lights)
Condition Light
Event Light
Fuel Temperature (each nacelle)
IFR Totalizer
IFR Fuel Temperature

TEST ENGINEERS' PANELS

The test engineer is located at the ECM operators station behind the photo-recorder. The recorder may be viewed through a two way mirror to facilitate the manual recording of data. The graphic recorders are also accessable to the engineer in flight and may be viewed by him at all times. Automatic fuel flow timing equipment for all engines and instrumentation controls are also operated by the engineer. An auxiliary test engineers station is located at the bombardiers station. This panel is equipped with fuel totalizers (all engines) and fuel transfer totalizers to each of the 4 main tanks. With this instrumentation the auxiliary engineer is able to moniter gross weight, center of gravity position, fuel transfers, and weight over air pressure ratio at all times.

GRAPHIC RECORDERS



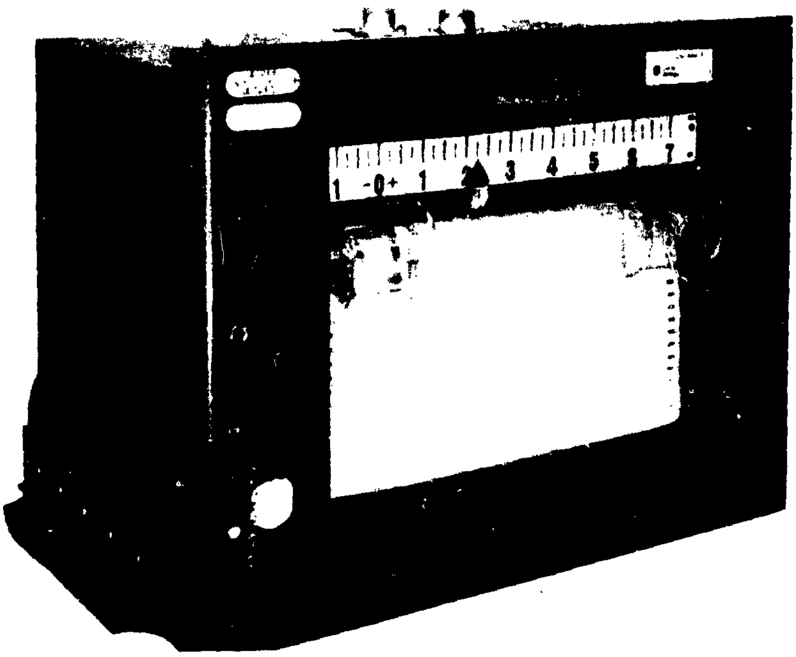
GRAPHIC RECORDER NO. 1:

Left Aileron Position
Right Aileron Position
Aileron Control Force
Angle of Bank
Airspeed
Sideslip Angle

GRAPHIC RECORDER NO. 2:

Rudder Position
Rudder Force
Elevator Position
Elevator Force
Pitch Angle
Normal Acceleration

BROWN RECORDER



Turbine Exit Temperature (All Engines)
Oil Inlet Temperature (All Engines)

WEIGHT AND BALANCE

The airplane was weighed prior to the first flight with all fuel, oil and water injection tanks empty. The hydraulic and oxygen systems were filled to capacity. The basic weight including test instrumentation was found to be 168,073 pounds with a center of gravity location of 31.14 percent MAC.

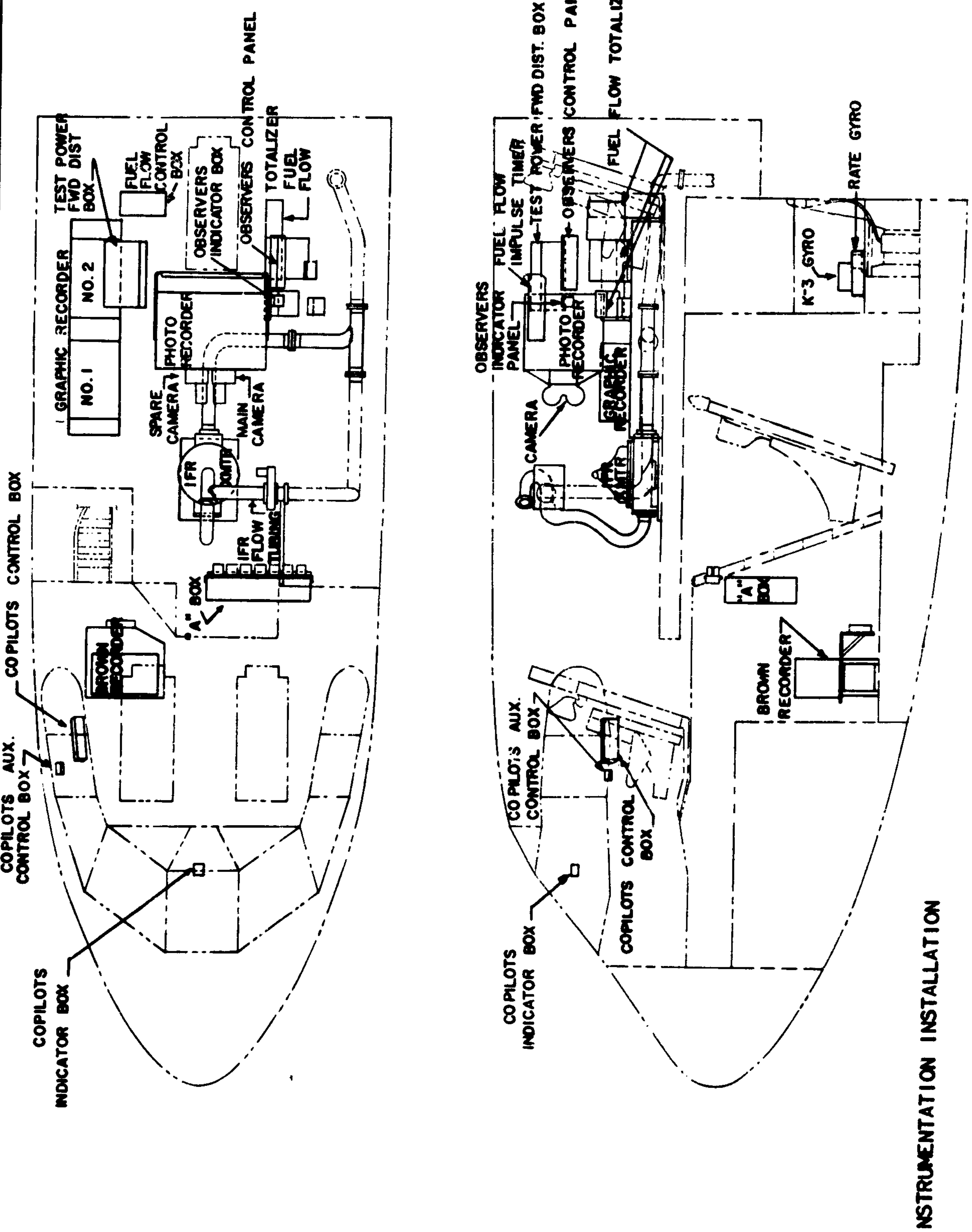
Weight and balance data for each flight conducted were as follows:

Flight No.	Basic* Weight Lbs.	Crew Lbs.	Fuel Lbs.	Oil Lbs.	Gross Weight Lbs.	C.G. % MAC	Water Injection Fluid Lbs.
1	168,338	1250	94,156	867	264,611	24.50	0
2	168,305	1500	153,127	867	323,799	26.55	0
3	168,305	1500	88,471	867	259,143	25.28	0
4	168,352	1250	191,295	867	361,764	25.68	0
5	168.352	1500	148,738	867	319,457	25.99	0

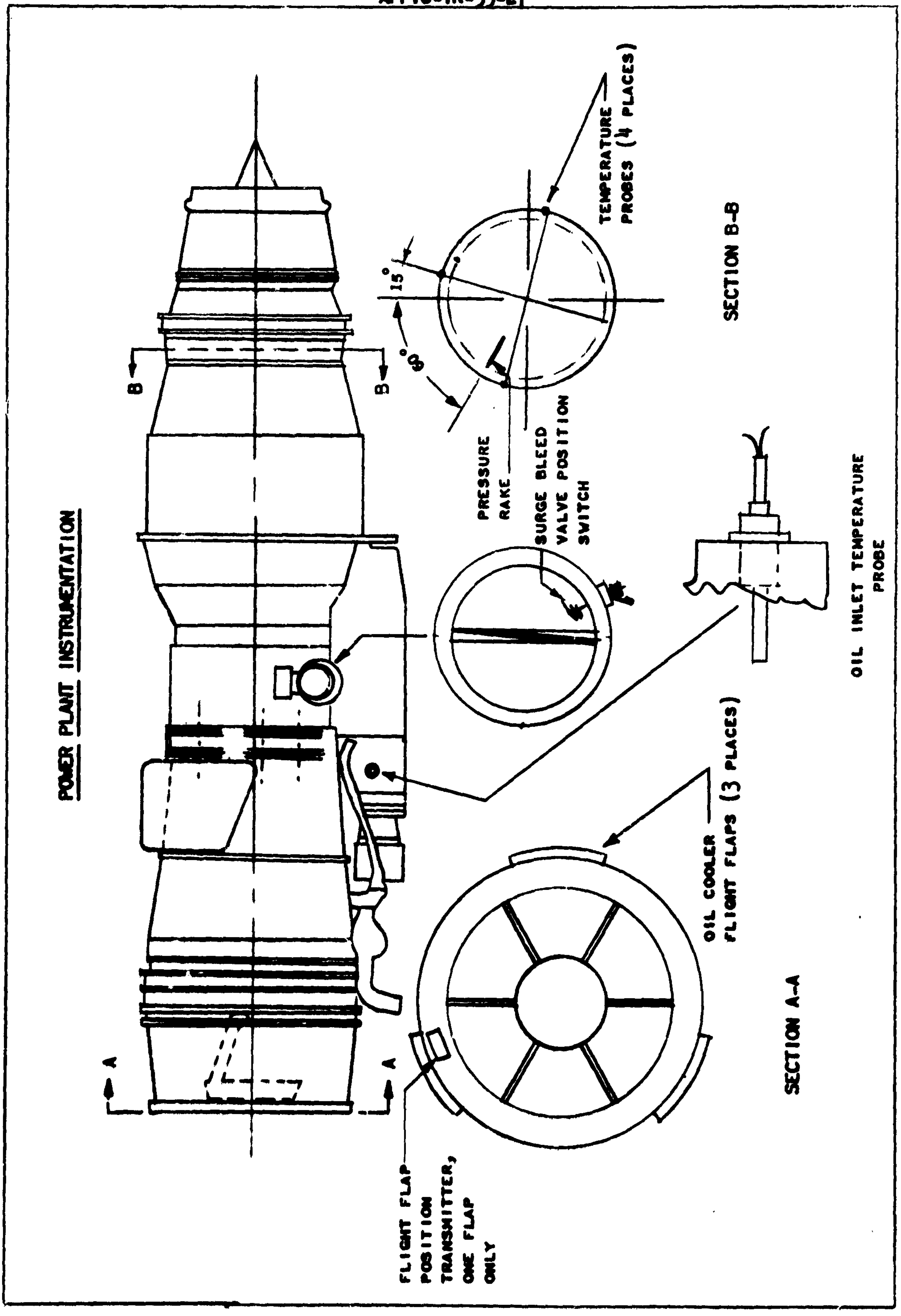
Flight No.	Basic* Weight Lbs.	Crew Lbs.	Fuel Lbs.	Oil Lbs.	Gross Weight Lbs.	C.G. % MAC	Water Injection Fluid Lbs.
6	168,352	1500	148,949	867	319,668	24.30	0
7	168,564	1250	151,689	867	319,370	27.19	0
8	168,564	1500	105,738	867	276,669	26.25	0
9	168,564	1250	151,985	867	322,666	26.11	0
10	168,564	1000	92,969	867	263,400	25.90	0
11	169,147	1000	91,218	867	262,232	24.54	0
12	169,147	1250	89,714	867	260,978	23.91	0
13	170,478	1250	48,821	867	221,417	22.07	0
14	169,132	1250	144,520	867	315,769	27.10	0
15	169,161	1250	151,399	867	322,677	26.40	0
16	169,204	1500	155,393	867	326,964	26.84	0
17	169,204	1250	201,572	867	373,143	24.50	0
18	169,204	1250	189,262	867	360,583	24.95	0
19	169,204	750	91,763	867	262,584	26.80	0
20	169,204	1500	218,841	867	390,412	23.80	0
21	168,764	1250	98,427	867	269,309	24.26	0
22	168,765	1250	210,147	867	381,029	25.87	0
23	168,765	1500	211,372	867	382,504	24.82	0
24	168,765	1500	210,146	867	381,278	21.97	0
25	168,765	1250	187,679	867	358,561	29.14	0
26	168,765	1250	110,249	867	281,131	25.18	0
27	168,765	1250	194,355	867	365,237	32.38	0
28	168,765	1250	92,035	867	259,797	25.06	0
29	168,767	1000	109,483	867	280,117	28.96	0
30	168,767	1000	116,283	867	289,958	30.37	3041
31	168,767	1250	107,407	867	281,332	32.80	3041
32	168,767	750	87,165	867	260,590	25.64	3041
33	168,767	1250	103,272	867	277,197	22.03	3041
34	168,773	1250	101,968	867	275,899	24.03	3041
35	168,785	1250	207,924	867	381,867	26.43	3041
36	168,785	1500	203,515	867	377,708	26.48	3041
37	168,785	750	100,168	867	270,570	26.44	0
38**	168,782	1250	147,674	867	322,838	29.60	3041
39**	168,782	1250	231,169	867	406,333	26.35	3041
40**	168,782	1500	125,204	867	300,618	29.33	3041
41**	168,782	1250	116,151	867	291,315	25.31	3041
42**	168,782	1000	233,567	867	408,481	26.86	3041
43**	168,782	1250	231,233	867	406,397	27.07	3041

* Includes Test Instrumentation

** 2, 1000 Gallon External Wing Tanks Installed

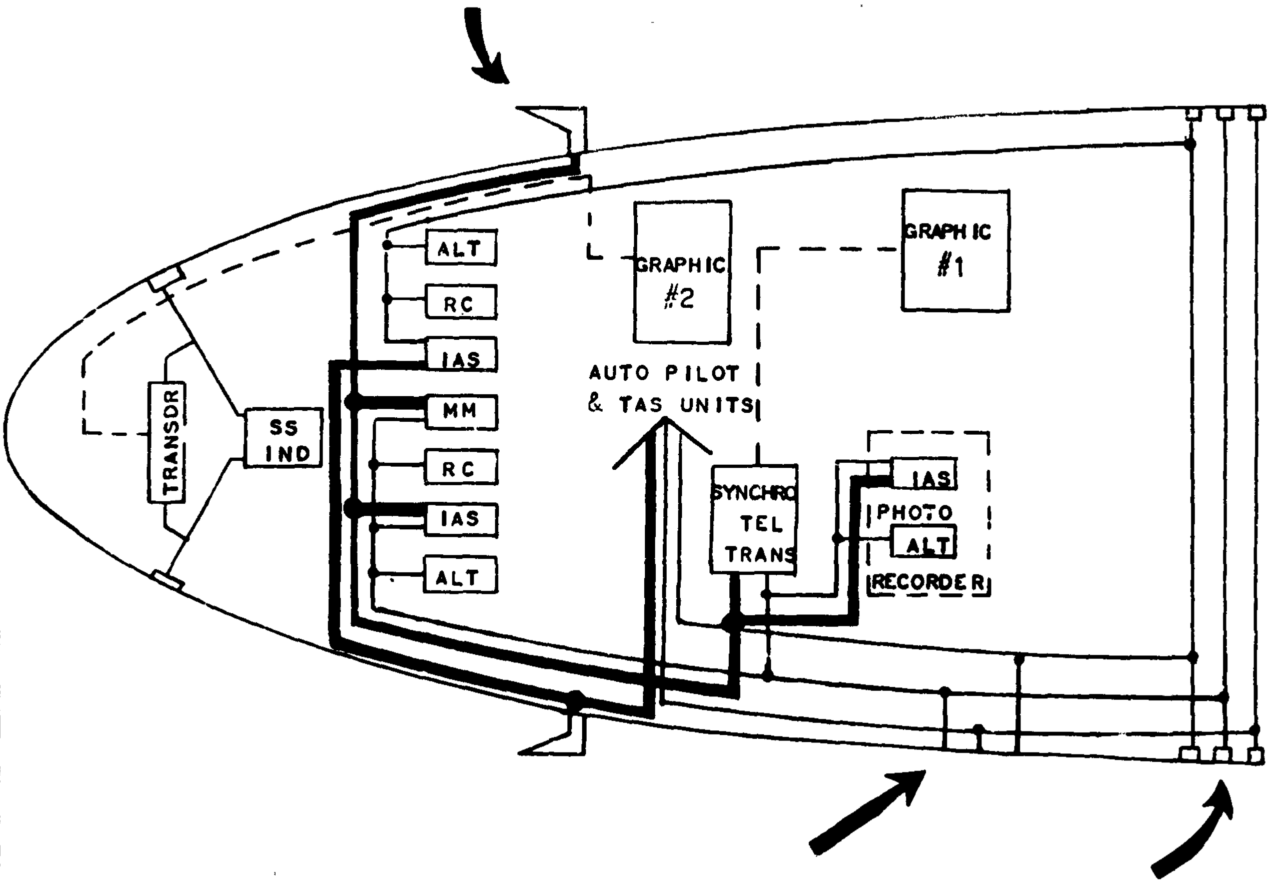


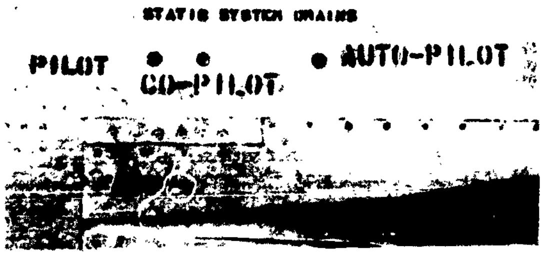
INSTRUMENTATION INSTALLATION



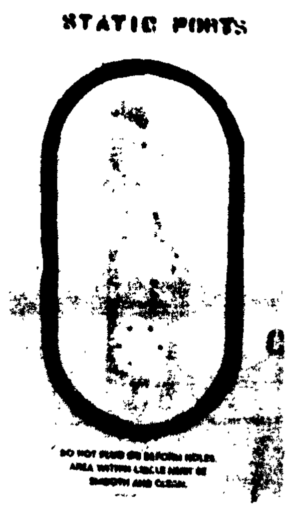
POWER PLANT INSTRUMENTATION

PILOT'S PITOT



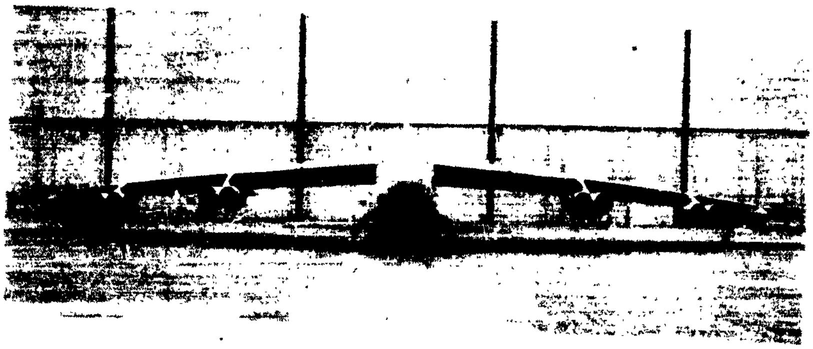


STATIC SYSTEM DRAINS

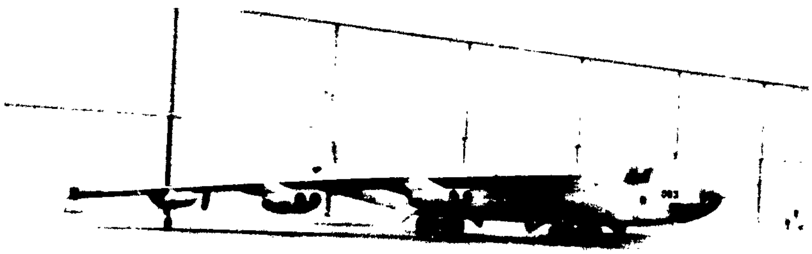


PILOT'S STATIC PORT

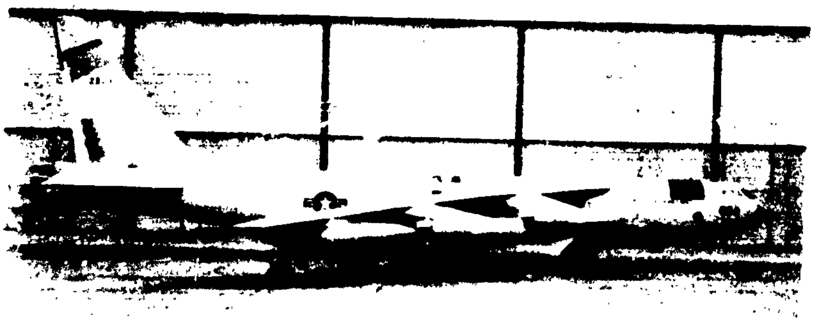
IDENTIFICATION PHOTOGRAPHS



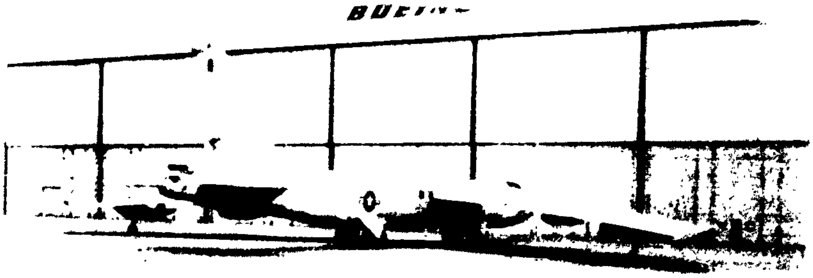
FRONT VIEW



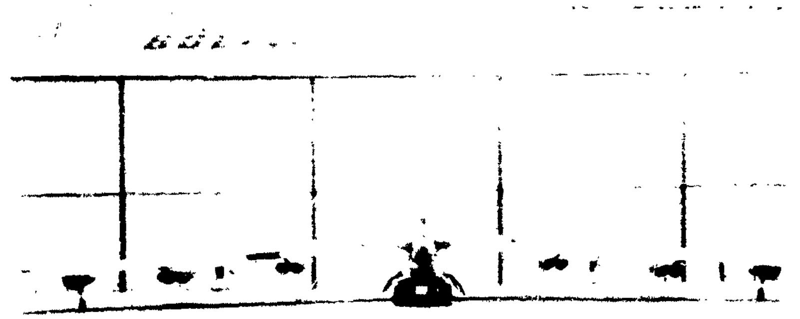
3/4 RIGHT FRONT VIEW



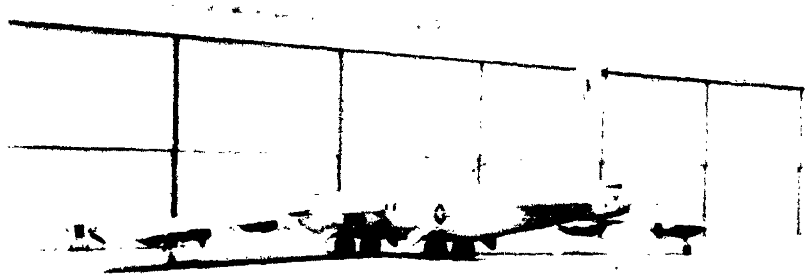
RIGHT SIDE VIEW



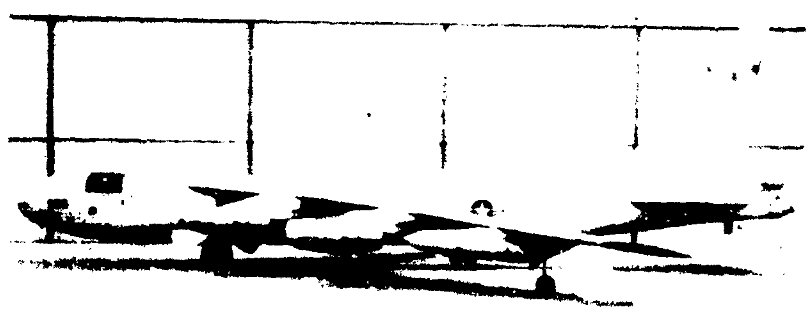
3/4 RIGHT REAR VIEW



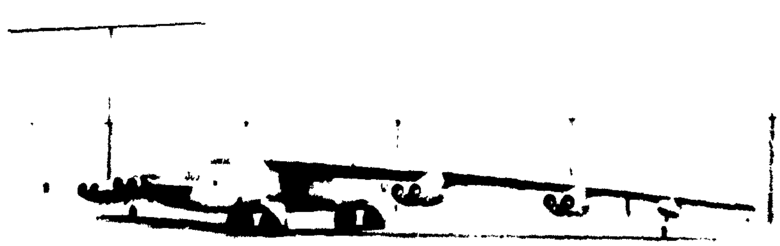
REAR VIEW



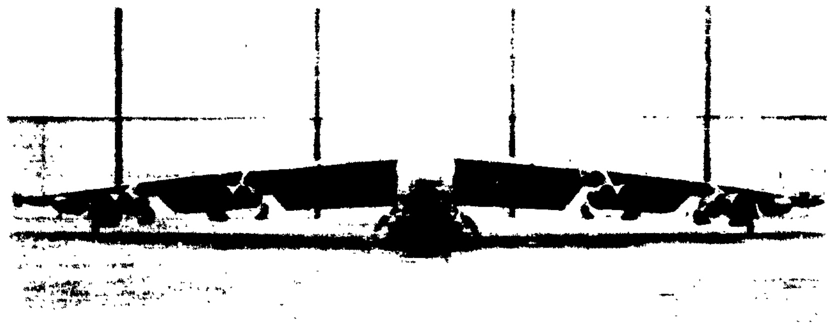
3/4 LEFT REAR VIEW



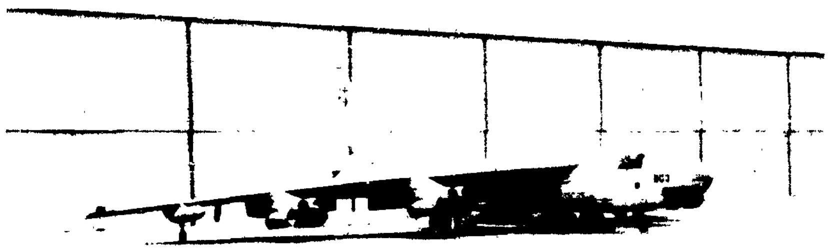
LEFT SIDE VIEW



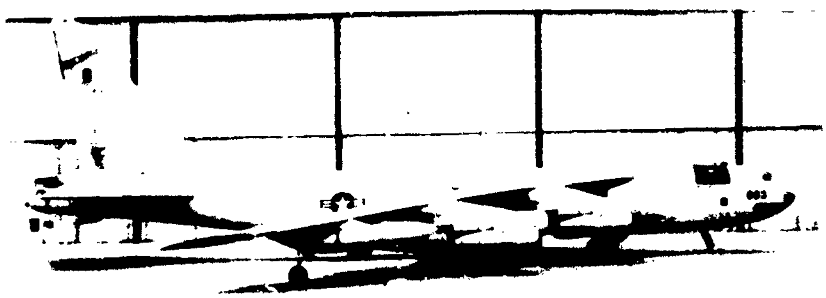
3/4 LEFT FRONT VIEW



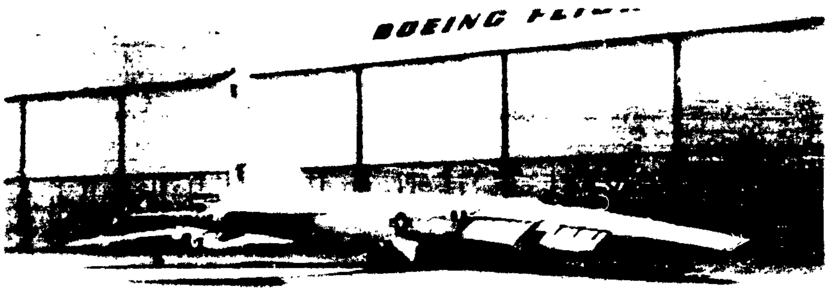
FRONT VIEW
FLAPS DOWN; BOMB BAY AND ACCESS DOORS OPEN



3/4 RIGHT FRONT VIEW
FLAPS DOWN; BOMB BAY AND ACCESS DOORS OPEN

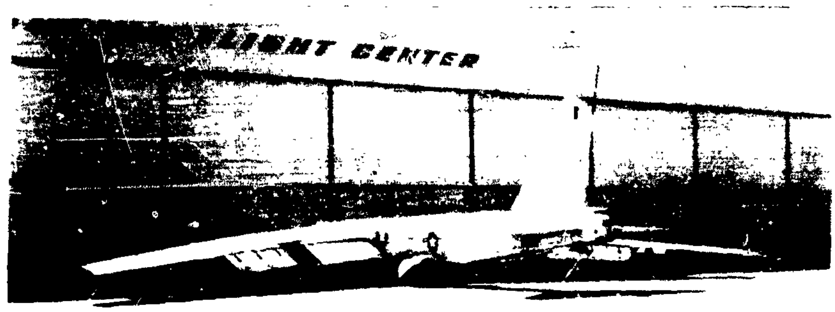


RIGHT SIDE VIEW
FLAPS DOWN; BOMB BAY AND ACCESS DOORS OPEN

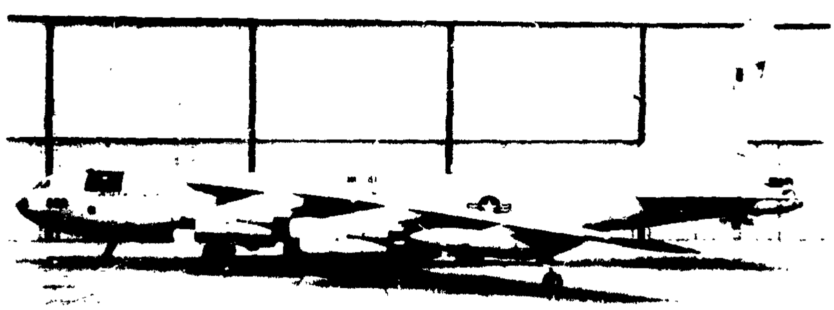


3/4 RIGHT REAR VIEW
FLAPS DOWN; BOMB BAY AND ACCESS DOORS OPEN

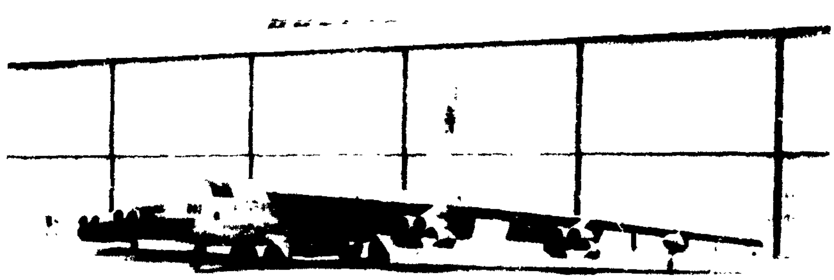
REAR VIEW
FLAPS DOWN; BOMB BAY AND ACCESS DOORS OPEN



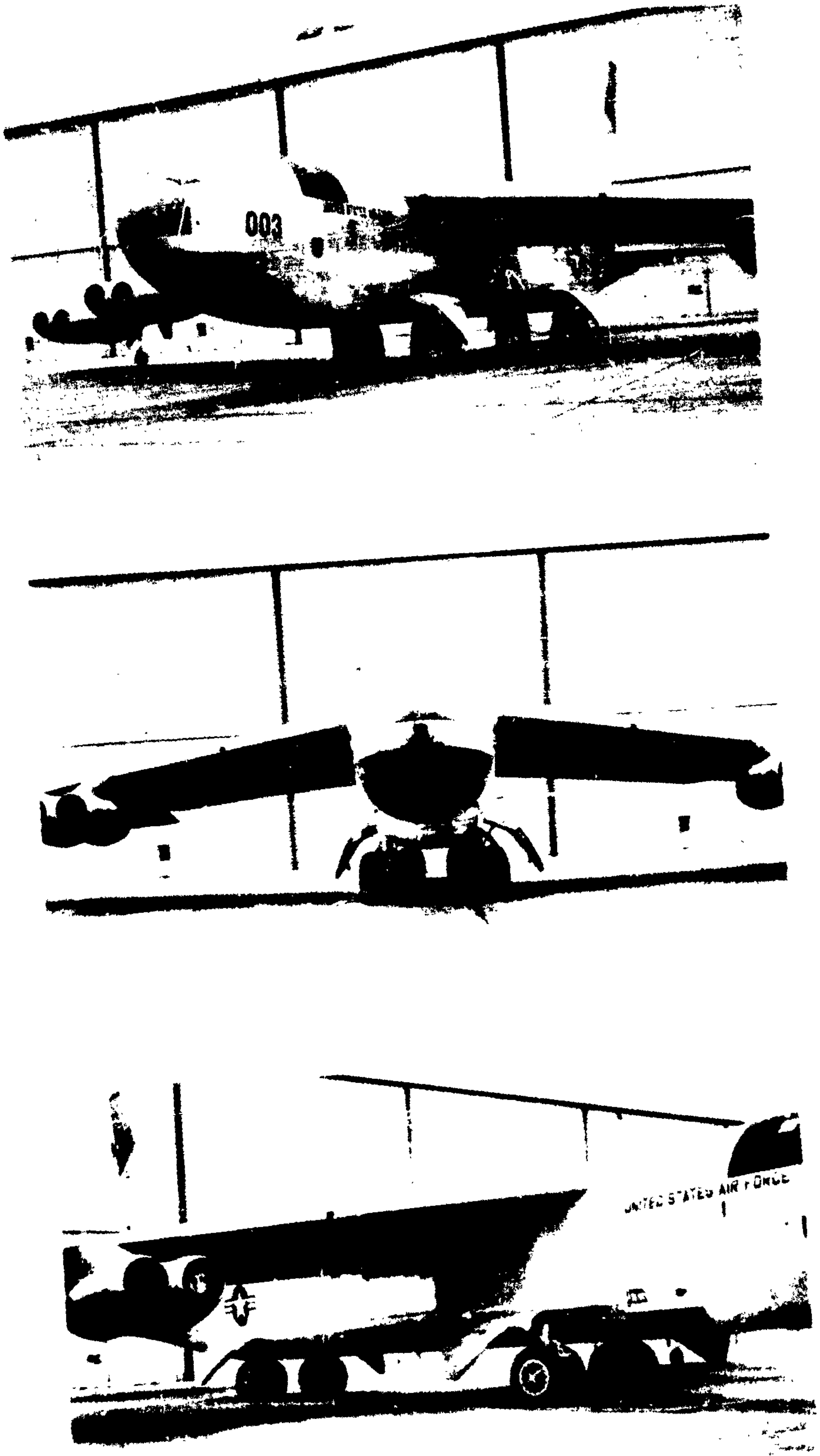
3/4 LEFT REAR VIEW
FLAPS DOWN; BOMB BAY AND ACCESS DOORS OPEN



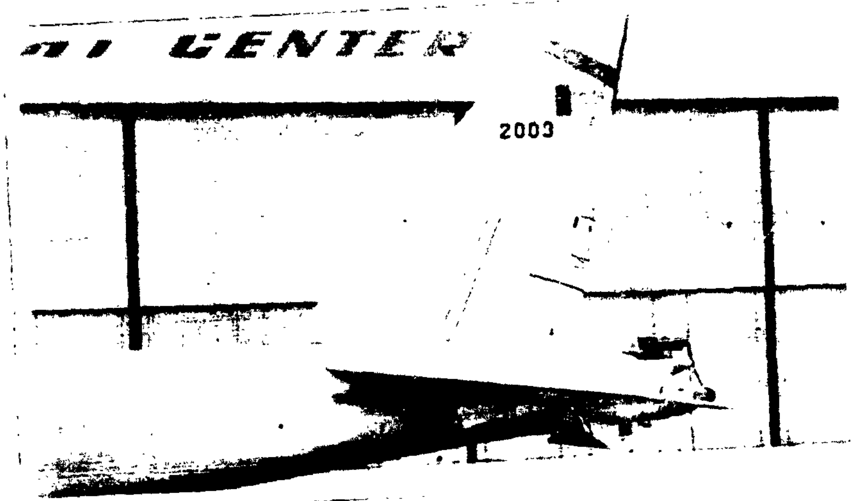
LEFT SIDE VIEW
FLAPS DOWN; BOMB BAY AND ACCESS DOORS OPEN



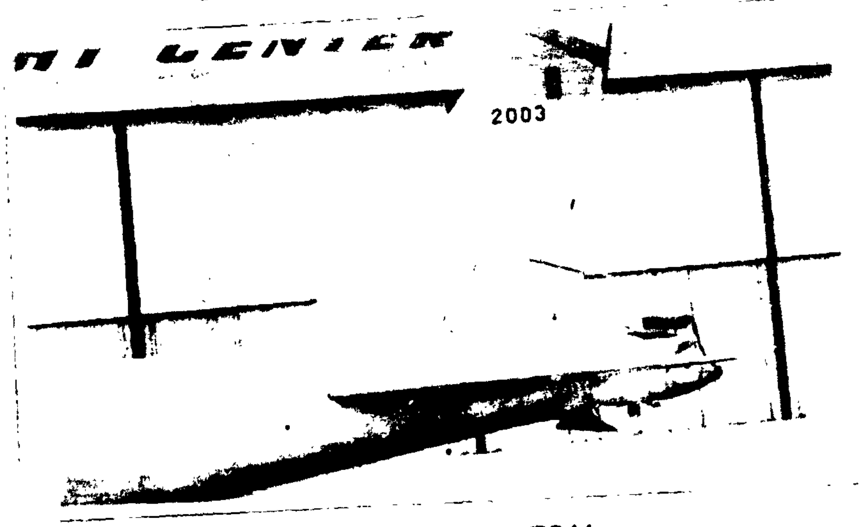
3/4 LEFT FRONT VIEW
FLAPS DOWN; BOMB BAY AND ACCESS DOORS OPEN



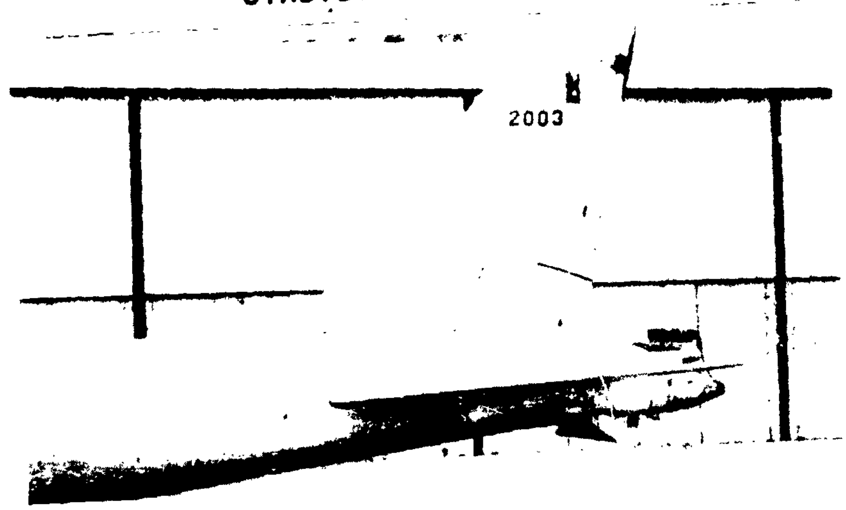
MAIN LANDING GEAR WITH 20 DEGREES RIGHT CROSSWIND TRIM



STABILIZER FULL NOSE DOWN

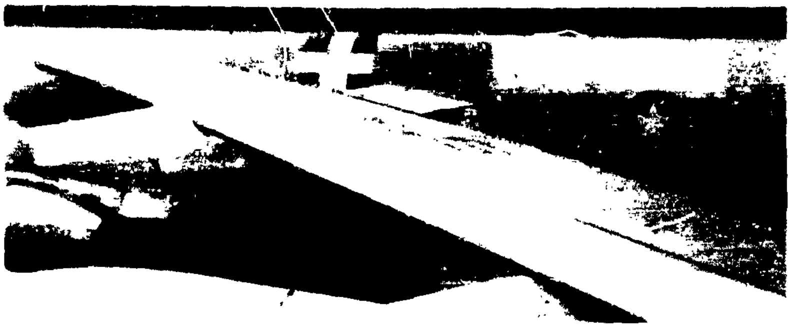


STABILIZER NEUTRAL

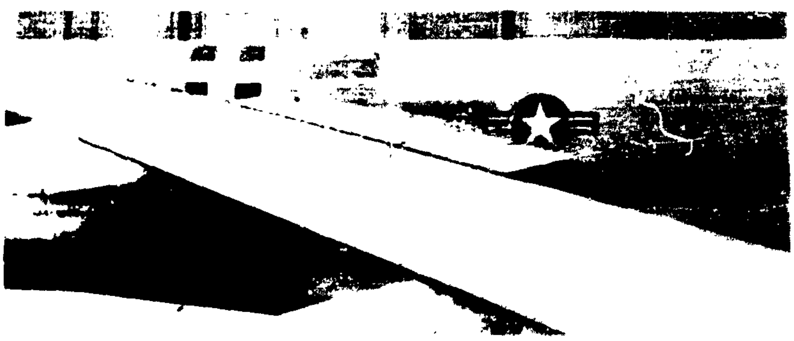


STABILIZER FULL NOSE UP

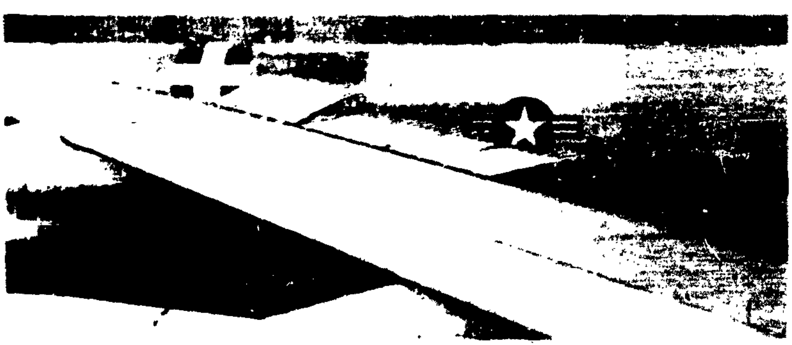
SPEED BRAKE RETRACTED, AILERON UP



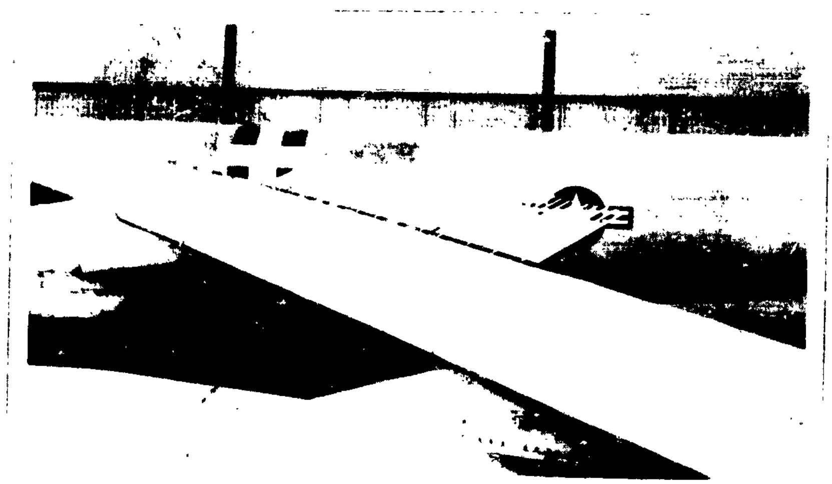
SPEED BRAKE POSITION I



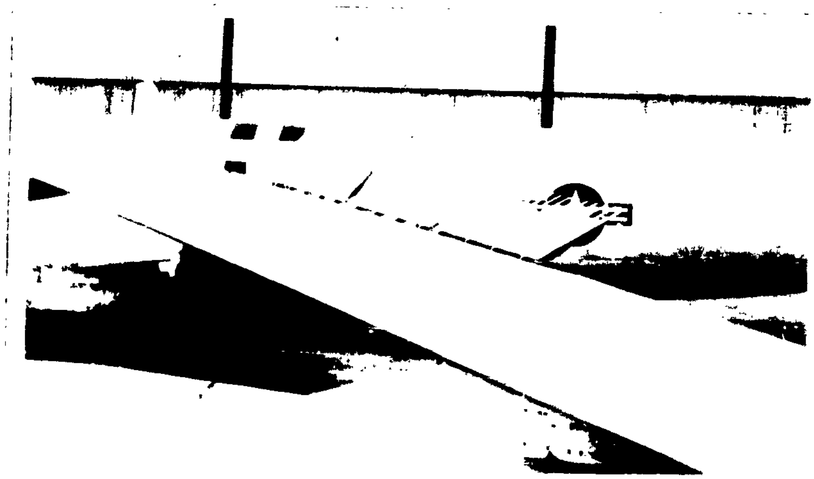
SPEED BRAKE POSITION 2



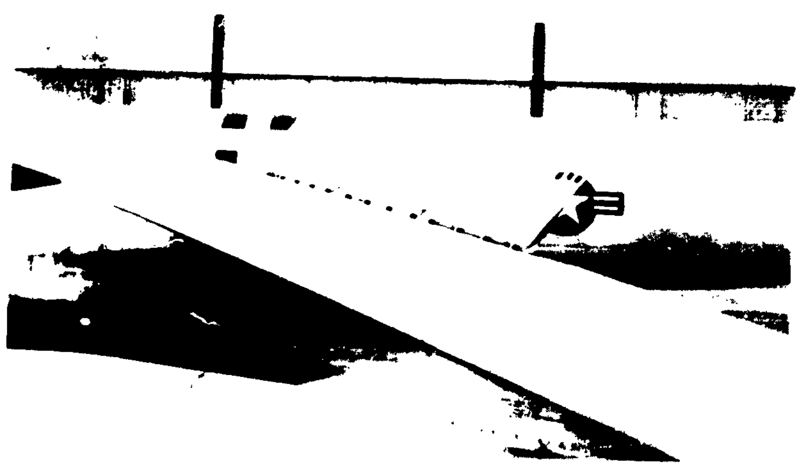
SPEED BRAKE POSITION 3



SPEED BRAKE POSITION 4



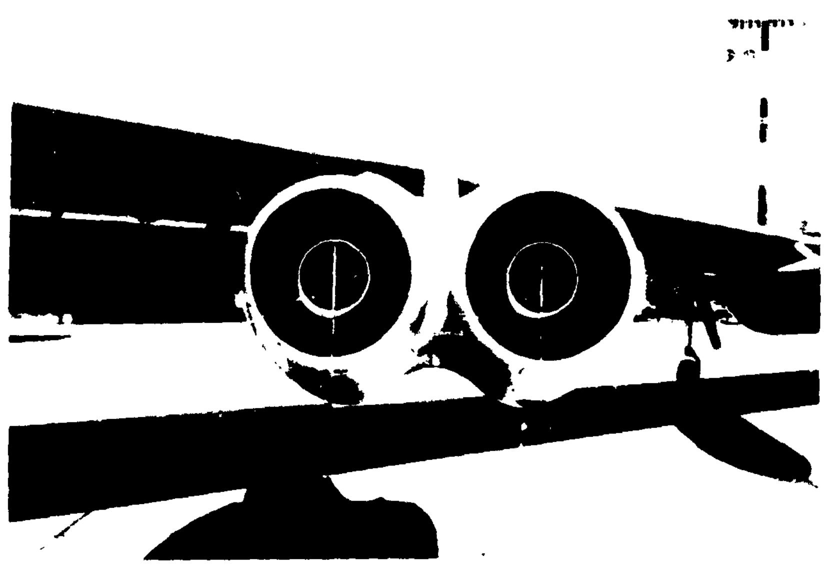
SPEED BRAKE POSITION 5



SPEED BRAKE POSITION 6

AERIAL REFUELING SLIPWAY DOORS CLOSED

AERIAL REFUELING SLIPWAY DOORS OPEN



NO. I NACELLE SHOWING OIL COOLER FLIGHT FLAPS FULL OPEN

FLIGHT TEST LOG

FLIGHT NO.	DATE 1955	FLIGHT TIME	TOTAL FLIGHT TIME	TEST
1	1-25	2:59	2:59	(1) Theodolite Takeoff (2) Level Accel. at 10,000, 20,000 and 30,000 feet MRP. (3) 30,000 ft. Speed Power at a W/δ of 800,000 lbs.
2	1-26	4:47	7:46	(1) Theodolite Takeoff (2) 3 Airspeed Calib. Points at 45,000 ft. at 2,000,000 W/δ. (3) 7 Engine Speed Power at 45,000 ft. at a W/δ of 1,800,000 lbs. (4) Complete Airspeed Calib. at 30,000 ft. at 800,000 W/δ. (5) Speed Power at 30,000 ft. at 800,000 W/δ.
3	2-1	3:18	11:04	(1) Theodolite Takeoff (2) Level Accel. at 10,000 ft. MRP. (3) 8 Engine Speed Power at 15,000 ft. at 400,000 W/δ. (4) 8 Engine Speed Power with 37% Flaps at 15,000 ft. and 400,000 W/δ. (5) Two Landings.
4	2-2	4:06	15:10	(1) Theodolite Takeoff (2) Speed Power at 40,000 ft. at 1,800,000 W/δ. (3) Airspeed Calib. at 40,000 ft. at 1,800,000 W/δ. (4) Speed Power at 45,000 ft., 2,000,000 W/δ.
5	2-3	5:24	20:34	(1) Theodolite Takeoff (2) 8 Engine Speed Power at 45,000 ft. at 1,800,000 W/δ. (3) 6 Engine Speed Power at 45,000 ft. at 1,800,000 W/δ. (4) 5 Engine Speed Power at 30,000 ft. at 850,000 W/δ. (5) Three Landings.
6	2-8	6:01	26:35	(1) Theodolite Takeoff (Crosswind Trim 7°) (2) Airspeed Calib. at 35,000 ft. at 1,200,000 W/δ. (3) Speed Power at 35,000 ft. at 1,200,000 W/δ. (4) Airspeed Calib. at 15,000 ft. at 400,000 W/δ. (5) 5 Engine Speed Power at 35,000 ft. at 1,050,000 W/δ. (6) Two Crosswind Landings, Last Landing using 8° Crosswind Trim, Drag Chute and Maximum Braking.
7	2-14	4:27	31:02	(1) Low Speed Airspeed Calib. Clean (Flight to EAFB) (2) Low Speed Airspeed Calib. Flaps Only. (3) Low Speed Airspeed Calib. Gear Down (A/B Out) (4) Low Speed Airspeed Calib. Gear Down, Flaps Down, A/B Out. (5) Low Speed Airspeed Calib. Flaps Down 37%.

FLIGHT NO.	DATE 1955	FLIGHT TIME	TOTAL FLIGHT TIME		TEST
-	2-15,16 & 17	--	--	(1)	Engine Static Thrust Calib., Wet and Dry.
				(2)	Engine 5 Minute Trim Runs.
8	2-18	2:38	33:40		Ferry Flight from Edwards Air Force Base No data because of airplane and engine malfunction.
9	2-25	5:48	39:28	(1)	Theodolite Takeoff
				(2)	7-Engine Maximum Power Check Climb 25,000 to 45,000 ft.
				(3)	7-Engine Speed Power at 40,000 ft. 1,700,000 W/δ.
				(4)	5-Engine Speed Power at 40,000 ft. 1,400,000 W/δ.
				(5)	Level Accel. at Mil Power at 10,000, 20,000, 30,000 & 40,000 ft. (7 Eng.)
				(6)	Level Accel. at Normal Rated Power at 10,000, 20,000, 30,000 and 40,000 ft. (7 Eng.)
10	2-28	1:56	41:24	(1)	Level Accel. at Military Rated Power at 10,000, 20,000, 30,000, 40,000 and 45,000 ft.; (8 Eng.)
				(2)	Level Accel. at Normal Rated Power at 10,000, 20,000, 30,000, 40,000 and 45,000 ft.; (8 Eng.)
				(3)	Max. Power Check Climb from 30,000 to 48,000 ft.
				(4)	Speed Power Attempted at 1,800,000 W/δ at 48,500 ft. but Aborted Due to Excessive Clear Air Turbulence.
11	3-19	2:36	44:00	(1)	Theodolite Takeoff
				(2)	Level Accel. at 10,000, 20,000, 30,000, 40,000 and 45,000 ft. at Military Rated Power and Normal Rated Power (8 Eng.)
				(3)	High Altitude Climb 50,000 to 53,000 ft.
				(4)	Max. Rate of Descent; Engines Idle, Gear Down, Air Brakes Up.
				(5)	Max. Braking Performance Landing, No Chute.
12	3-23	3:41	47:41	(1)	Theodolite Takeoff
				(2)	Military Power Check Climb to 45,000 ft.
				(3)	Speed Power at 1,600,000 W/δ at 45,000 ft.
				(4)	Max. Braking Performance Landing, Wet Runway, No Chute.
13	3-26	2:28	50:09		Project "Steve".
14	4-1	5:46	55:55	(1)	Theodolite Takeoff (Flaps Up)
				(2)	Level Accel. at 5,000 ft. 8, 7 and 6 Engines, Flaps Down Only, Gear Down Only and Gear and Flaps Down.
				(3)	Level Accel. at 15,000 ft.; 8, 7 and 6 Engines, Flaps Down Only.
				(4)	Check Climb from 15,000 to 45,000 ft., Mil Power Eight-Engine.
				(5)	.8 Mach Descent With Gear and Full Airbrakes made from 45,000 to 35,000 ft. Level Flight Decel. made at 35,000 ft., Normal Rated Power used in Descent and Decel.

FLIGHT NO.	DATE 1955	FLIGHT TIME	TOTAL FLIGHT TIME	TEST
				(6) 4-Engine Speed Power at 850,000 W/δ at 30,000 ft. (7) 4-Engine Speed Power at 1,050,000 W/δ at 35,000 ft. (8) 3-Engine Speed Power at 600,000 W/δ at 25,000 ft. NOTE: No. 3 right hand spoiler became disengaged from the aircraft during the .8 Mach descent and damaged the trailing edge of the right wing and right outboard flap. It was not known that the spoiler was lost until after landing.
15	4-11	4:58	60:53	(1) Theodolite Takeoff (4° Rt. Cross Wind Trim) Max. Performance. (2) Level Accel. at 5,000 ft., 8, 7, and 6 Engines Flaps Down Only, Gear Down Only and Gear and Flaps Down. (3) Level Accel. at 15,000 ft., 8, 7 and 6 Engines, Flaps Down Only. (4) Aileron Rolls at 20,000 Feet, 350 Knots. (5) Airspeed Calib.; Flaps and Gear. (6) Airspeed Calib.: Gear Only. (7) Airspeed Calib.; Flaps and Air Brake.
16	4-20	3:17	64:10	(1) Theodolite Takeoff, Full Nose Up Elevator, Max. Perf. 8-Engine Speed Power, 1,600,000 W/δ, 40,000 ft. Theodolite Landing, Max. Braking with Chute.
17	4-25	11:49	75:59	(1) Theodolite Takeoff, Max. Perf. (2) Long Range Mission, 1,700,000 W/δ.
18	4-29	7:16	83:15	(1) Theodolite Takeoff, Max. Performance. (2) Airspeed Calib.; Flaps Full Down (3) Airspeed Calib.; Flaps Gear and Airbrakes (4) Speed Power Flaps Full Down 600,0[illegible] [illegible]/δ (5) Speed Power 8 Engine W/δ 1,200,0[illegible] [illegible]5,000 Ft. (6) Speed Power 8 Engine W/δ 1,600,000 40,000 Ft. (7) Speed Power 8 Engine W/δ 1,800,000 45,000 Ft. (8) Aileron Rolls at 20,000 Feet 250 Knots and 160 Knots (9) Max. Lift Coefficient at 48,000 Feet.
19	5-3	4:44	87:59	(1) Theodolite Takeoff, Max. Performance (2) Military Power Check Climb to 50,000 Feet. (3) 6 Engine Speed Power at 1,500,000 W/δ 45,000 Feet. (4) 8 Engine Speed Power at 1,800,000 W/δ 50,000 Feet.
20	5-5	14:00	101:59	(1) Max. Performance, Theodolite Takeoff (2) Range Mission, 1,700,000 W/δ to 45,000 Feet. 45,000 Feet Remainder of Mission.

FLIGHT NO.	DATE 1955	FLIGHT TIME	TOTAL FLIGHT TIME	TEST
21	5-27	4:14	106:13	(1) Maximum Performance Theodolite Takeoff. (2) Military Power Check Climb to 40,000 Feet. (3) Airspeed Calib. at 1,200,000 W/δ 38,000 Feet. (4) Static Directional Stability 30,000 Feet at .8 Mach. (5) 3 Engine Speed Power at 600,000 W/δ 25,000 Feet. (6) Airspeed Calib. at 1,400,000 W/δ at 43,000 Feet.
22	6-1	6:50	113:03	(1) Maximum Performance Theodolite Takeoff. (2) Military Rated Thrust and Normal Rated Thrust Level Accel. at 10,000, 20,000, 30,000 and 40,000 Feet. (3) Speed Power 8 Engine, 1,600,000 W/δ, 37,000 Feet, 350,000 lbs. (4) Speed Power 8 Engine, 1,600,000 W/δ, 40,000 Feet, 295,000 lbs., Bomb Bay Doors Open. (5) Static Longitudinal Stability, 30,000 Feet, 270,000 lbs., 18% MAC, Elevator Used for Speed Control (6) Static Longitudinal Stability, 30,000 Ft., 270,000 lbs., 18% MAC, Stabilizer Used for Speed Control. (7) Dynamic Longitudinal Stability, 30,000 Ft., 260,000 lbs. (8) Dynamic Lateral-Directional Stability 30,000 Ft., 260,000 lbs., .6 and .8 Mach No., Controls Fixed. (9) Stick Force Per "G", 30,000 Ft., 250,000 lbs., 18% MAC, .86 Mach.
23	6-3	6:59	120:02	(1) Maximum Performance Theodolite Takeoff (2) Military Rated Thrust Level Accel. at 30,000 and 40,000 Ft., 7 Engine. (3) Normal Rated Thrust Level Accel. at 30,000 Ft., 7 Engine. (4) Speed Power 8 Engine, 1,800,000 W/δ, 40,000 Ft., 335,000 lbs., Bomb Bay Doors Open. (5) Speed Power 8 Engine, 2,000,000, W/δ, 45,000 Ft., 295,000 lbs., Bomb Bay Doors Open. (6) Dive from 45,000 to 35,000 Ft., and Decel. at 35,000 Ft., Gear Down, Speed Brakes Up. Test Dive to Determine High Speed Drag of A/C in Max. Rate of Descent Config. (Spoiler Flutter Excessive at .8 Mach) (7) Static Longitudinal Stability, 48,000 Ft., 260,000 lbs., 35% MAC, Elevators Used for Speed Control. (8) Maximum Performance Theodolite Landing, Chute Used, Runway Wet.

FLIGHT NO.	DATE 1955	FLIGHT TIME	TOTAL FLIGHT TIME	TEST
24	6-6	7:44	127:46	(1) Maximum Performance Theodolite Takeoff NOTE: Used 9000 Ft., of Runway (8700 Ft. Ground Roll), 1000 Ft. more than predicted, Forward C.G. Config., Full Nose Up Trim and Full Nose Up Elevator Were Required to Takeoff at a Speed 10 Knots IAS Higher than Normal Take-off Speed. (2) Military Rated Thrust and Normal Rated Thrust Level Accel. 10,000, 20,000, 30,000 and 40,000 Ft. (3) Speed Power 8 Engine, 1,800,000 W/δ, 40,000 Ft., 335,000 lbs., Tip Gear Extended. (4) Speed Power 6 Engine, 1,700,000 W/δ, 40,000 Ft., 300,000 lbs. (5) Maximum "G" at 1st Buffet over Complete Speed Range, 40,000 Ft., 280,000 lbs. (6) Static Longitudinal Stability, 30,000 Ft., 270,000 lbs., 35% MAC, Elevator Used for Control. (7) Static Longitudinal Stability, 30,000 Ft., 270,000 lbs., 35% MAC, Stabilizer Used for Control. (8) Dynamic Longitudinal Stability, 30,000 Ft., 260,000 lbs., 35% MAC. (9) Stick Force per "G", 30,000 Ft., 260,000 lbs.. 35% MAC. (10) Longitudinal Trim Changes, 10,000 Ft., 240,000 lbs., 35% MAC. (11) Maximum Performance Landing, No Chute Used.
25	6-10	7:20	135:06	(1) Maximum Performance, Theodolite Takeoff (2) Military Rated Power Check Climb to 43,000 Ft. (3) Speed Power 7 Engine, 1,900,000 W/δ, 42,000 Ft.. 335,000 lbs. (4) Maximum "G" Obtainable at Constant Altitude Over Complete Speed Range, 40,000 Ft., 290,000 lbs. (5) Dive from 45,000 Ft. to 35,000 Ft., and Decel. at 35,000 Ft.. Gear Down, Speed Brakes Up. (6) Maximum "G" Obtainable at Constant Altitude, 3 High Speed Points Only, 30,000 Ft., 280,000 lbs. (7) Static Longitudinal Stability, 30,000 Ft., 270,000 lbs., 26% MAC, Elevator Used for Control. (8) Static Longitudinal Stability, 30,000 Ft., 270,000 lbs., 26% MAC, Stabilizer Used for Control. (9) Stick Force per "G", 30,000 Ft., 260,000 lbs., 26% MAC. (10) Rudder Control Effectiveness, 10,000 Ft., No. 1 Engine and 2 Engine Cut.

FLIGHT NO.	DATE 1955	FLIGHT TIME	TOTAL FLIGHT TIME		TEST
				(11)	Simulated Reduced Engine Go-Arounds, 10,000 Ft., No. 1 Engine Cut, No. 1 and 2 Engines Cut, and No. 1, 2 and 3 Engines Cut.
					NOTE: Tests were conducted at full power only as directional control was maintained to stall buffet in all instances.
				(12)	Maximum Performance Theodolite Landing, No Chute.
26	6-13	2:28	137:34	(1)	Normal Rated Power Check Climb
				(2)	Static Directional Stability, 48,000 Feet V_{max}.
				(3)	Dynamic Longitudinal Stability, 18% MAC, 48,000 Ft., $V_{max.}$, .8 M and .7 M.
				(4)	Dynamic Lateral-Directional Stability, 48,000 Ft., $V_{max.}$, .8 and .7 M.
				(5)	Static Longitudinal Stability, 48,000 Ft., 18% MAC, Elev. Used for Speed Control.
				(6)	Static Longitudinal Stability, 48,000 Ft., 18% MAC, Stabilizer Used for Speed Control.
					NOTE: Flight aborted during test (6) because contact with tail gunner lost. Maximum rate of descent and emergency landing were made. Gunner was found to be okay. Failure of tail compartment interphone and radio system caused loss of contact.
27	6-16	6:59	144:33	(1)	Maximum Performance Theodolite Takeoff
				(2)	Normal Rated Power Check Climb (8 Engine)
				(3)	Airspeed Calib., 1,800,000 W/δ 40,000 Ft., 335 000 lbs.
				(4)	Speed Power 1,700,000 W/δ 40,000 Ft.. 300,000 lbs., 6-Engine, Asymmetric Power, Aircraft Trimmed with Needle and Ball Cent.
				(5)	Airspeed Calib., 1,900,000 W/δ, 43,000 Ft.. 300,000 lbs.
				(6)	Speed Power 1,800,000 W/δ, 44,000 Ft., 270,000 lbs., 6-Engine, Symmetric Power Conditions.
				(7)	Airspeed Calib., 1,200,000 W/δ, 37,000 Ft., 260,000 lbs., No Cabin Pressure.
				(8)	Stick Force per "G" 48,000 Ft., 18% MAC, 250,000 lbs.
				(9)	Aileron Rolls 48,000 Ft. $V_{n_{rp}}$, with and without Rudder, with & without Spoilers.
				(10)	Static Longitudinal Stability 48,000 Ft., 18% MAC, Stabilizer Used for Speed Control.
				(11)	Stalls, 48,000 Ft., Accel. & Straight Ahead Stalls, 18% MAC.
					NOTE: Rather violent engine surge encountered on straight-ahead stalls on all 8 engines, 2 engines flamed-out.

FLIGHT NO.	DATE 1955	FLIGHT TIME	TOTAL FLIGHT TIME		TEST
				(12)	Maximum Performance Landing Made Without Chute.
28	6-17	1:07	145:40		Demonstration Flight for Lt. Gen. Power and Maj. Gen. Wood.
29	6-20	5:14	150:54	(1)	Maximum Performance Theodolite Takeoff
				(2)	Normal Rated Power Check Climb to 46,000 Ft.
				(3)	Stick Force per "G" 48,000 Ft., 26% MAC, 260,000 lbs.
				(4)	Static Longitudinal Stability, 48,000 Ft., 26% MAC, 255,000 lbs.. Elevator Used for Speed Control.
				(5)	Static Longitudinal Stability, 48,000 Ft.. 26% MAC, 255,000 lbs.. Stabilizer Used for Speed Control.
				(6)	Maximum "G" Available in Level Flight over Complete Speed Range at Full Power 48,000 Ft.
				(7)	Simulated Emergency Descent, 4 Engines Cut-off, 4-Engines Idle, Gear Down, Speed Brakes Up, 49,000 to 15,000 Ft.
				(8)	Speed Power 550,000 W/δ, 22,000 Ft., 240,000 lbs., 4 Engines, 1, 2, 7 and 8 Cut.
				(9)	Speed Power Flaps Down, 400,000 W/δ, 225,000 lbs., 15,000 Ft.
				(10)	Maximum Performance Landing, Chute Used, Spoilers on, Position 2 on Approach and Position 6 on Touchdown.
30	6-22	4:27	155:21	(1)	Maximum Performance Takeoff, Water Inj. Used.
				(2)	Military Rated Power Check Climb to 48,000 Ft., 8 Engines.
				(3)	Stick Force per "G" 35% MAC, 48,000 Ft., 260,000 lbs.
				(4)	Static Longitudinal Stability, 35% MAC, 48,000 Ft., 255,000 lbs.. Elevator Used for Speed Control.
				(5)	Static Longitudinal Stability, 35% MAC, 48,000 Ft.. 255,000 Lbs.. Stabilizer Used for Speed Control.
				(6)	Dynamic Longitudinal Stability 35% MAC, 48,000 Ft., 250,000 lbs., V_{max}.. .8 and .7 Mach.
				(7)	Stalls, 48,000 Ft., Accelerated and Straight Ahead, 35% MAC, Power On.
				(8)	Normal Descent with Speed Brakes Up and Gear Retracted and All Engines Idle Attempted - Aborted Due to Adverse Weather Cond.

FLIGHT NO.	DATE 1955	FLIGHT TIME	TOTAL FLIGHT TIME	TEST
				(9) Dynamic Longitudinal Stability, 10,000 Ft., Power Approach Config., 35% MAC, 1.2 V_{SL}, 230,000 lbs.
				(10) Dynamic Lateral-Directional Stability, 10,000 Ft., Power Approach Config., 1.2 V_{SL}, 230,000 lbs.
				(11) Stick Force per "G", 10,000 Ft., Power Approach Config., 35% MAC, 1.2 V_{SL}, 225,000 lbs.
				(12) Static Longitudinal Stability, 10,000 Ft., Power Approach Config., 35% MAC, 1.2 V_{SL}, Elevator Used for Speed Control.
				(13) Static Longitudinal Stability, 10,000 Ft.. Power Approach Config., 35% MAC, 1.2 V_{SL}, Stabilizer Used for Speed Cont.
				(14) Maximum Performance Landing, Full Speed Brakes on Approach, Maximum Braking on Landing, No Chute Runway Damp.
31	6-24	5:38	160:59	(1) Military Power Check Climb to 48,000 Ft., 8 Engines
				(2) Stick Force Per "G", 35% MAC, 48,000 Ft., 260,000 lbs., Bomb Bay Doors Open.
				(3) Static Longitudinal Stability, 35% MAC, 48,000 Ft., 255,000 lbs., Bomb Bay Doors Open, Elevator Used for Speed Cont.
				(4) Static Longitudinal Stability, 35% MAC, 48,000 Ft., 255,000 lbs., Bomb Bay Doors Open, Stabilizer Used for Speed Cont.
				(5) Dynamic Longitudinal Stability, 35% MAC, 48,000 Ft., 250,000 lbs., Bomb Bay Doors Open V_{max}., .8 and .7 Mach.
				(6) Dynamic Lateral Directional Stability, 48,000 Ft., 250,000 lbs., Bomb Bay Doors Open, V_{max}., .8 and .7 Mach.
				(7) Stall, Power Off, 48,000 Ft., 35% MAC.
				(8) Normal Performance Descent, 50,000 to 15,000 Ft.. All Engines Idle, Speed Brakes Up, Gear Retracted.
				(9) Stalls, Power Approach Config., Power On and Power Off, 35% MAC.
				(10) Speed Power, 3 Engine, 400,000 W/δ, 15,000 Ft., 225,000 lbs.
				(11) Max. Performance Landing, No Speed Brakes On Approach and Landing, No Chute Used, Max. Braking.
32	6-27	2:34	163:33	(1) Maximum Performance Theodolite Takeoff, Water Injection Used.
				(2) Military Power Check Climb to 50,000 Feet.
				(3) Speed Power, 8 Engine, 2,200,000 W/δ, 51,000 Feet.
				(4) Maximum Lift Coefficient at Constant Altitude at 50,000 Ft.

FLIGHT NO.	DATE 1955	FLIGHT TIME	TOTAL FLIGHT TIME	TEST
				(5) Maximum Performance Theodolite Landing, Speed Brakes On Position 2 On Approach and Full Up on Landing, Maximum Braking Used with Chute.
33	6-29	3:57	167:30	(1) Maximum Performance Theodolite Takeoff, Water Used.
				(2) 7 Engine Military Rated Thrust Check Climb to 40,000 Feet.
				(3) 4 Engine Speed Power, 35,000 Feet, 1,050,000 W/δ, 255,000 Pounds, All Engines Out on One Side.
				(4) Dynamic Longitudinal Stability at 30,000 Feet, 240,000 lbs., 18% MAC, V_{max}. Clean Configuration.
				(5) Stalls, 10,000 Feet, Power Approach Configuration, 18% MAC Power for Level Flight and Power at Idle, 235,000 lbs.
				(6) Longitudinal Trim Changes, 230,000 lbs.. 18% MAC, 8000 to 16,000 Ft.
				(7) Max. Performance Theodolite Landing, Airbrakes on Position 2 on Approach, Full Up on Landing, Chute Used.
34	7-1	3:36	171:06	(1) Max. Performance Theodolite Takeoff, Water Used.
				(2) 7 Engine Normal Rated Thrust Check Climb to 40,000 Ft.
				(3) Partial 4 Engine Speed Power, 20,000 Ft., 550,000 W/δ, 250,000 lbs., 20,000 Ft. all Engines Out on One Side.
				(4) Stalls, Straight Ahead and Accelerated at 20,000 Ft., Clean Configuration, 18% MAC.
				(5) Dynamic Longitudinal Stability, 10,000 Ft., Power Approach Configuration, 18% MAC, 240,000 lbs.
				(6) Stick Force Per "G" 10,000 Ft., Power Approach Configuration, 18% MAC, 235,000 lbs.
				(7) Static Longitudinal Stability, 10,000 Ft., Power Approach Configuration, 18% MAC, Elevator Used for Speed Control, 230,000 lbs.
				(8) Static Longitudinal Stability, 10,000 Ft., Power Approach Configuration, 18% MAC, Stabilizer Used for Speed Control, 225,000 lbs.
				(9) Light Weight Military Power Check Climb to 48,000 Feet, 8 Engines.
				(10) Partial Speed Power, 1,600,000 W/δ, 48,000 Feet, 8 Engines, Test Stopped Due to Malfunction of No. 4 Engine.
				(11) Maximum Performance Theodolite Landing, Airbrakes on Position 2 on Approach, Full Up on Touchdown, Chute Used.

FLIGHT NO.	DATE 1955	FLIGHT TIME	TOTAL FLIGHT TIME	TEST
35	7-12	9:00	180:06	(1) Maximum Performance Theodolite Takeoff, 381,867 lbs., Water Injection Used.
				(2) Military Rated Power Check Climb, 7 Engines.
				(3) Speed-Power, 7 Engines, 1,600,000 lbs., W/δ, 37,000 Feet, 350,000 lbs.
				(4) 3-hours, Phase V Penetration Let-Downs and Ground Controlled Approaches.
				(5) Speed Power, 4 Engine, (All Engines Out on Right Side), 850,000 lbs., W/δ, 30,000 Feet, 255,000 lbs.
				(6) Stick Force Per "G", 10,000 Feet, 26.5% MAC, 240,000 lbs., Power Approach Configuration.
				(7) Static Longitudinal Stability, Elevator Used for Speed Control, 10,000 Feet, 26.5% MAC, 235,000 lbs., Power Approach Configuration.
				(8) Static Longitudinal Stability, Stabilizer Used for Speed Control, 10,000 Ft., 26.5% MAC, 230,000 lbs., Power Approach Configuration.
				(9) Sideslips, 10,000 Feet, 225,000 lbs., Power Approach Configuration.
				(10) Dynamic Lateral-Directional Stability, Clean Configuration, 10,000 Feet, .6 Mach.
				(11) Light Weight Check Climb, Military Rated Thrust, 8 Engine.
				(12) Speed Power, 8 Engines, 1,600,000 W/δ, 48,000 Feet, 200,000 lbs.
				(13) Normal Descent, Speed Brakes Up, Gear Down, All Engines Idle, 260 Knots Max. IAS.
				(14) Maximum Performance Landing, No Chute or Airbrakes, Wheel Brakes Only.
36	7-15	7:02	187:08	(1) Maximum Performance Theodolite Takeoff, Water Injection Used.
				(2) Military Rated Thrust Check Climb, 8 Engines.
				(3) Speed Power, 6 Engine, 1,600,000 lbs. W/δ, 37,000 Feet, 350,000 lbs.
				(4) 3-Hours, Phase V Penetration Let-Downs and Ground Controlled Approaches.
				(5) Flaps Down Check Climb, 8 Engines, Military Rated Thrust.
				(6) Flaps Down Check Climb, 6 Engines, Military Rated Thrust.
				(7) Gear Down Check Climb, 8 Engines, Military Rated Thrust.
				(8) Gear and Flaps Down Check Climb, 8 Engines, Military Rated Thrust.
				(9) Speed Power, Gear and Flaps Down, 400,000 lbs. W/δ, 15,000 Feet, 230,000 lbs.

FLIGHT NO.	DATE 1955	FLIGHT TIME	TOTAL FLIGHT TIME	TEST
				(10) Speed Power, Gear, Flaps, and Full Airbrakes, 400,000 lbs., W/δ, 16,000 Feet, 220,000 lbs. (11) Maximum Performance Theodolite Landing, Chute and Full Airbrakes on Touchdown, 6 Engines Cut on Touchdown, No Wheel Brakes Used.
37	7-19	3:57	191:05	(1) Maximum Performance Theodolite Takeoff. (2) Speed Power, 400,000 W/δ, 13,000 Feet, 240,000 lbs., Gear and Airbrakes. (3) Speed Power, 400,000 W/δ, 16,000 Feet, 220,000 Pounds, Gear and Flaps Down, Airbrakes, Position 2. (4) Check Climb, 8 Engines, Military Rated Thrust. (5) Speed Power, 1,800,000 W/δ, 50,000 Feet, 211,000 lbs., Oil Cooler Maximum Open. (6) Speed Power, 2,200,000 W/δ, 55,000 Feet, 200,000 lbs. (7) Maximum Performance Landing, No Chute, No Airbrakes, Wheel Brakes Only.
38	7-27	2:23	193:28	(1) Maximum Performance Theodolite Takeoff, Water Injection Used. (2) Check Climb to 42,000 Feet, Military Rated Power, 8 Engines. (3) Speed Power, 8 Engines, 1,600,000 W/δ, 40,000 Feet, 295,000 lbs. (4) Maximum Performance Landing, Full Airbrakes on Touchdown, Air Brakes on No. 2 Position on Approach. Maximum Braking and Chute Used. NOTE: Flight aborted due to high frequency buzz noted in the aircraft at speed above .84 Mach.
39	7-29	5:47	199:15	(1) Maximum Performance Theodolite Takeoff, Water Injection Used. (2) Level Accelerations at Military Rated Power and Normal Rated Power at 10,000, 20,000, 30,000 and 40,000 Feet, 8 Engines. Military Rated Power, 7 Engines at 10,000 and 40,000 Ft. (3) Speed Power, 8 Engines, 1,800,000 W/δ, 335,000 lbs., 40,000 Feet. (4) Speed Power, 8 Engines, 2,000,000 W/δ, 295,000 lbs., 45,000 Feet. (5) Maximum Rate of Descent, Gear Down, Full Airbrakes, All Engines Idle. (6) Maximum Performance Landing, Full Airbrakes on Touchdown, Airbrakes on No. 2 Position on Approach, Maximum Braking and Chute Used.

FLIGHT NO.	DATE 1955	FLIGHT TIME	TOTAL FLIGHT TIME	TEST
40	8-1	3:26	202:41	(1) Maximum Performance Theodolite Takeoff, Water Injection Used.
				(2) Stalls, Straight Ahead, 1 "G" and Accelerated Cruise Configuration.
				(3) Dynamic Longitudinal Stability, 30,000 Feet, .8 Mach, 35% MAC, 270,000 lbs.
				(4) Aileron Rolls, 48,000 Feet, .8 Mach, 260,000 lbs.
				(5) Dynamic Longitudinal Stability, 48,000 Feet, .8 Mach, 35% MAC, 265,000 lbs.
				(6) Dynamic Lateral-Directional Stability, 48,000 Ft., .8 Mach, 255,000 lbs.
				(7) Stick Force Per "G", 48,000 Ft., 35% MAC, 250,000 lbs.
				(8) Static Longitudinal Stability, 48,000 Feet, 250,000 lbs., 35% MAC, Elevator Used for Speed Control.
				(9) Static Longitudinal Stability, 48,000 Ft., 250,000 lbs. 35% MAC, Stabilizer Used for Speed Control.
				(10) Maximum Rate of Descent, Gear Down, Speed Brakes Up, All Engines Idle.
				(11) Stalls, Power Approach Configuration, Power On and Power Off, 35% MAC, 240,000 lbs.
				(12) Aileron Rolls, Power Approach Configuration, All Spoilers Out on One Side, 10,000 Ft.
				(13) Aileron Rolls, Flaps Up, Power Approach Configuration, All Spoilers Out on One Side, 10,000 Ft.
				(14) Simulated Go-Arounds With Asymmetric Power Conditions, 1, 2, 3 and 4 Engines Out One Side.
41	8-3	3:09	205:50	(1) Maximum Performance Theodolite Takeoff, Water Injection Used.
				(2) Aileron Rolls at 20,000 Ft., 350 Knots, 270,000 lbs., Spoilers Operative and Inoperative.
				(3) Stalls 20,000 Ft., 265,000 lbs., Forward C.G., Straight Ahead and Accelerated.
				(4) Dynamic Longitudinal Stability 30,000 and 48,000 Ft., 18% MAC, 260,000 lbs., .8 Mach Number.
				(5) Dynamic Lateral-Directional Stability 30,000 and 48,000 Ft., 260,000 lbs., .8 Mach Number.
				(6) Stick Force Per "G", 48,000 Ft., 250,000 lbs., 200 Knots, 18% MAC.
				(7) Static Longitudinal Stability, 48,000 Ft., 240,000 lbs., 18% MAC, Elevator Used for Speed Control.
				(8) Static Longitudinal Stability, 48,000 Ft., 240,000 lbs., 18% MAC, Stabilizer Used for Speed Control.
				(9) Maximum Rate of Descent, 43,000 to 25,000 Feet, Gear Retracted, Speed Brakes Extended, Idle Power.
				(10) Stalls, Power Approach Configuration, 10,000 Feet, Flaps Down and Up, 18% MAC, 220,000 lbs.

FLIGHT NO.	DATE 1955	FLIGHT TIME	TOTAL FLIGHT TIME	TEST
				(11) In-Flight Refueling With a KC-97 Tanker. Nine Contacts Were Made. 3,000 lbs. of Fuel Transferred.
				(12) Maximum Performance Landing, No Flaps, Chute, Speed Brakes and Maximum Braking.
42	8-9	3:34	209:24	(1) Maximum Performance Theodolite Takeoff. Water Injection Used.
				(2) 8-Engine Military Rated Power Check Climb to 41,000 Feet.
				(3) Speed Power, 8 Engines, 1,700,000 lbs. W/δ, 37,000 Feet, 370,000 lbs.
				(4) Maximum Rate of Descent, Gear and Speed Brakes Extended - Idle Power.
				(5) Maximum Performance Landing, Chute, Speed Brakes and Maximum Braking.
43	8-10	3:09	212:33	(1) Normal Short Field Theodolite Takeoff. Water Injection Used.
				(2) 8-Engine Normal Rated Power Check to 39,000 Feet.
				(3) Three-Speed Power Points, 2,000,000 lbs. W/δ, 40,000 Ft., 370,000 lbs.
				(4) Five-Speed Power Points 1,800,000 lbs. W/δ, 38,500 Feet, 360,000 lbs.
				(5) Five-Speed Power Points 1,600,000 lbs. W/δ, 37,000 Ft., 350,000 lbs.
				(6) Maximum Rate of Descent, Gear and Air Brakes Extended, Engines at Idle.
				(7) Maximum Performance Theodolite Landing Chute, Air Brakes and Wheel Brakes Used.

PROGRAM COMPLETED - TOTAL FLIGHT TIME - 212 Hours, 33 Minutes

TOTAL CALENDAR TIME - 7 Months, 16 Days

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